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# Hygiene

**A SANITARY AND SOCIAL MAGAZINE,**

DEVOTED TO THE CONSIDERATION OF

*Public Health, House Building, Drainage, Ventilation, Warming, Foods, Beverages, Dietetics, Adulteration, Health Resorts and Mineral Springs, Domestic Medicine and Sanitation, Regimen for the Sick Room, New Articles of Food, New Remedies and Inventions, with other matters of Sanitary and Social Importance.*

EDITED BY

**Wm. ABBOTTS, M.D., M.R.C.P., Lond.**

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# Hygiene,

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## OUGHT HOSPITAL PATIENTS TO PAY?

BY JABEZ HOGG,

Formerly (for 25 years) Surgeon to the Royal  
Westminster Ophthalmic Hospital, &c.

THE President of the Statistical Society, in an inaugural address recently delivered, brought prominently to our notice the uses and abuses of the London Hospital system, and which of late has engrossed a very considerable amount of public attention. In the first place he thought it might not unreasonably be assumed from all that has been said and written on the subject for many years past, that the present hospital system of London and other large cities, is gradually breaking down from sheer inability to deal with the unprecedented growth and consequent changed condition of life in the metropolis. The funds of the endowed hospitals, which were formerly large and quite equal to all demands made upon them, are, on their own showing, no longer adequate to their wants. The voluntary hospitals are even in a worse plight, as may be gathered from the incessant begging appeals made in the public press. They seem to be rapidly consuming the invested capi-

tal of former and more prosperous years, and are without hope of replacing it by any reliable or more permanent sources of income. The distribution of the hospitals, other than those connected with the poor-laws, for the indoor treatment of the sick poor, has not followed or kept pace with the enormous outgrowth of the metropolis, and the consequent compulsory changes of residence, thereby devolving on the labouring classes, who for the most part live from hand to mouth. From these circumstances alone, most of the more deserving among the non-pauper sick poor do not, and cannot, as a rule, obtain at the outset the relief so much needed in all serious and acute attacks of disease. Much of their time is sadly wasted with the certainty of a serious aggravation of their maladies in an unsuccessful attempt to gain admission to the general hospitals. Thus it comes about that pauperism, too often, follows in the train of long illnesses, and for which the working man cannot justly be held responsible. Under these circumstances, Dr. Mouat holds that "it is to the interest of the community in general, and to the advantage of the temporarily destitute sick poor in particular, that the State should step in and afford aid in all

viating and removing, as far as possible, these unavoidable evils, and this it can do without any direct violation of the sound and established principles which should always regulate the action of the ruling powers in dealing with social defects among a free and self-reliant people." The too central grouping of the existing London hospitals is an evil which leads to an enormous waste of time among the deserving poor; the absolute inadequacy of the number of beds in them, even if the whole of them were made available for the poor only, is an evil of greater magnitude under the best arrangements, as a considerable number of them must be retained for accidents and emergencies. We have recently learnt upon good authority that nearly 2000 beds are compulsorily empty simply from a want of funds to maintain them in constant use. With reference to the difficulties involved in the proximity of the London hospitals, six of which are seen to be within a radius of half a mile of each other; nineteen and a lunatic asylum within a mile; 31, with more than one poor-law infirmary and a lunatic asylum within a mile and a half, and so on: it would be manifestly impossible and impracticable to attempt the removal of any of the older of them and reconstruct them elsewhere, as was done under exceptional circumstances, and at an almost ruinous cost in the case of St. Thomas's Hospital. Irrespective of the enormous cost of such a proceeding, and the entire dislocation of a system of which the long continuance has constituted what very many of its supporters regard as a prescriptive right, it is quite unnecessary to do so. Dr. Mouat believes, if proper use were made of the magnificent poor-law infirmaries, an extension of their usefulness would follow, and this might very easily be brought about, if sanctioned by the Legislature.\* But here we are at once con-

fronted with a more difficult question than that of *charity*, one which seems to point to the direct failure of most plans dealing with certain important defects of the present magnificent institutions which were founded to secure to the honest, necessitous, deserving poor, needful and prompt help in severe or disabling sickness, without the intrusion of any moral or social degradation. The first, and most important step then, in the re-organisation of the relief in times of sickness among the deserving poor, is the elimination of such relief from the pains and penalties of pauperism, and its more efficient treatment as a question of health as well as of public policy. On this particular point however, considerable difference of opinion still prevails. The late Professor Fawcett held that if any extension of the principle already allowed in "the Medical Relief Disqualification Removal Bill" was brought about, it would seriously interfere with the cultivation of thrift; that it would be likely to hold out encouragement to the working classes to mis-spend money upon themselves, which ought to go to Benefit Societies and Sick Clubs, at all events is opposed to the sound principle of the Poor Laws' Act of 1834. Dr. Mouat however, reminds us that the cultivation of thrift is a very excellent thing in itself, and the Poor Laws are good and wise when properly administered, but there are older laws, than that of 1834, the laws of common humanity, which should not be set aside from any motive of expediency. Mr. Booth who has been engaged on the classification of the poor of this vast metropolis, says, there are a million of human beings amongst us living in a state bordering on want, and for the majority of whom elemosynary aid would doubtless be required in times of sick-

\*There are no less than 12,000 beds in 25 Metropolitan Poor Law Infirmarys, all of which are at present una-

available for educational purposes, the clinical teaching of the medical student, and otherwise improving his educational standard, which is essential to the health of the inhabitants of cities and the country at large.

ness, in illness which could not be safely treated in their own poor homes, whether they were able to make provision for it or not. The majority of these are undoubtedly fit objects for hospital relief. A far greater amount of good might undoubtedly be done by the Sick Asylums and Poor Law Infirmarys of London, if the Local Government Board would not insist upon branding the afflicted poor with the hated stigma of pauperism, and the pains and penalties attached thereto. A first help in sickness might always be conceded to the deserving poor. We have Dr. Mouat's assurance that it needs not the expenditure of a single shilling to render the Poor Law Infirmarys of London the best general hospitals in the kingdom. With respect to their structural arrangements and means of classifying and treating the sick medically and surgically, nothing can be better; but as a remedy for the evils which have been very fully discussed in public, that is with reference to hospital management generally, Dr. Mouat proposes forthwith to create a central "Board of Supervision, in which all the interests concerned shall be fairly and fully represented, which for the present should leave untouched the usual procedure of all authorities connected with existing institutions; it should have power of control and supervision similar to those now possessed and exercised by such a body as the Metropolitan Asylums' Board, and armed with authority to call for detailed returns, on a uniform plan of finance and statistics, with a view to their digest and publication annually, in such a manner as may be deemed most useful." Furthermore, he is of opinion that no fitter occasion could have been found to make such changes as may be required in the whole hospital system, than the present when both the art and science of medicine itself is undergoing rapid and radical changes, such as have already revolutionised much of the procedure and practice in many important directions, and which indicate still greater

changes in the immediate future, all tending to the saving of life, the increase of the standard of health, and the general well-being of the community.

The burning question of Provident Dispensaries, is passed over in silence, as Dr. Mouat finds the field too vast to be susceptible of consideration within reasonable limits. Nevertheless, it is one which cannot longer be relegated with impunity, since it is generally admitted that the present system of hospital relief renders the Provident movement well-nigh impracticable. Patients continue to crowd into the waiting rooms of the free and open hospitals, so that they cannot be adequately dealt with, or properly treated, from want of funds. But the reform of this most vicious system must be brought about by the hospital authorities themselves, and the work should at once be taken in hand; as they are all suffering from the same failing--want of funds. The greater part of their subscriptions are expended on a class that should either join a benefit society, subscribe to a neighbouring provident dispensary, or call in the nearest medical man, and pay him his moderate fee. For the small sum of one penny a-week the artizan can make himself independent of hospital help, and for another penny he and his family can become free of charity doles. Hospitals are in every sense of the word charities, upwards of a hundred of them are subsidized by the Hospital Sunday Fund. If charity could supply all the money needed for the medical and surgical relief of the poor of the Metropolis, it would perhaps be wiser to hand it over to the Guardians of the Poor, for them to apply in aid of the rates, and for improving the machinery of the Poor Law. Charity is apparently not disinclined to accept the situation, by its totally ignoring and neglecting the Poor Law and its excellent hospitals, instead of performing the higher charity of compelling constituted authorities to fulfil their dutie

under the several Acts of Parliament passed to make adequate provision for all the medical wants of the very poor. The London Hospitals seem to scramble for all the sick, a small residuum only is left for the Poor Law Infirmarys to deal with.

If this were not so, a sifting process would have been introduced, whereby the numbers might have been greatly reduced, all fit and proper cases relieved, and the hospitals would not have been overburdened by patients. There is certainly no reason why the medical schools should not be attached to the Poor Law Infirmarys, rather than that a hundred hospitals should compete for patients, under the assumption that they must do so, while only eleven of them have medical schools attached to them.

On the other hand, the Provident, or pay system is based on the principle of self-help, that each should pay according to his means. This at once adjusts relations between the natural independence felt by Englishmen and that of the acceptance of charity, and tends to supply the proper support to hospital finances. The pay system, however, if not properly safeguarded may be abused, and to the injury of the medical profession. This question of not injuring the medical practitioner is an important one, since he is compelled to obtain his knowledge and skill at a large expenditure of time and money. He more often attains to middle life than he does not, before he earns his living. It is therefore, most necessary and proper that, excepting in cases of emergency, and hospitals especially needed for teaching, those hospitals having Medical Schools should not take even all patients who can afford to pay the whole or a substantial part. Such as can pay should be refused admittance, and relegated to the general practitioner, or the Provident Dispensary. In speaking of the pay system I wish it to be understood that I strongly object to the pay system of separate wings, as adopted at St. Thomas' and Guy's Hospital. No

worse system can be adopted, nor better devised to do material injury to the medical profession, and to the general practitioner in particular.

## FOOD FOR THE DESTITUTE POOR.

DECEMBER chills and fogs, such as we have just experienced, with the reports of the sufferings resulting therefrom, must compel even the least thinking person to admit that the amount of the destitution in all populous places is absolutely appalling; while they stimulate public authorities and private philanthropists to do all in their power to cope with so gigantic an evil.

There are many people who, regardless of the selfish origin of their argument, assert that any form of charity tends to lower the independent spirit, and to increase the thriftlessness, of those who are its recipients; but we trust that they will allow that to feed the hungry in a proper systematised manner is, at any rate, not so open to objection as most other methods of assisting the poor and needy. The piercing cold of winter is sufficiently trying to the well-clad and equally well-fed citizen; what must it be then to the poor, shivering creatures, whose rags barely cover up their miserable benumbed and starved bodies?

Yet, when it is considered how cheaply and how efficiently the poor may be fed in large numbers, it is strange that more efforts are not made in this direction. In London, various societies are specially devoted to the distribution of food and soup to the necessitous poor during the winter months, and we propose in this article, to give some idea of their operations.

One of the most important of these institutions is the Model Soup Kitchen in the Euston Road, not far from the Portland Road Station. It was established in 1846, for the following

laudable objects:—to assist in preserving the health of the labouring classes during the winter season by supplying suitable and nourishing food at cost price, and also to benefit poor persons by enabling the kindly disposed to purchase tickets for distribution among such as are known to be deserving, but are unfortunately involved in temporary distress by sickness or scarcity of employment. The tickets are sold in books at the rate of twelve for eighteenpence; each entitling the holder to a pint of soup and half a penny-loaf, or to one pint of rice milk and bread. How highly this simple but nutritive repast is appreciated may be judged from the fact that in one winter alone nearly 18,000 gallons of soup were disposed of, and that poor people's pence to the extent of 40,000 helped to defray the cost of the food supplied. In four hours of the mid-day, viz., between 11 a.m. and 3 p.m., and sometimes even in a less space than that, 1,000 hungry men, women, and children, have been known to enter the portals of the Model Soup Kitchen, and to have a warm, sustaining meal. The soup is prepared in three large coppers, holding respectively, twenty, thirty, and forty gallons. The quantities of different ingredients employed in the preparation of the soup are as follows, in every twenty gallons:—Flour, 6 lbs.; bacon (at 6d. per lb.) 4 lbs.; rice, 2 lbs.; dried peas, 22 lbs.; onions, 4 lbs.; carrots and turnips, one large bunch of each; salt and pepper to flavour. Another recipe, that for beef soup, is for twenty gallons:—Half of an ox-head at 5s., stewed to a jelly; barley, 9 lbs.; flour, 7 lbs.; onions, 4 lbs.; rice, 6 lbs.; carrots and turnips, as in the other recipe, pepper and salt. It is estimated that the articles are purchased at the rate of three farthings per pint of soup; the rent of the premises, wages of five persons, cooking and other necessary expenses being equivalent to the other three farthings of the 1½d. charged for each ticket.

Another large soup kitchen, also, rather

singularly, established in 1846, in Leicester Square, and now at Ham Yard, Great Windmill Street does a large amount of good. In one winter it furnished to the necessitous 50,000 dinners at 1d. each, while a great number of free meals—more than 180,000—were also given out. Here a different system of management to that adopted at the previously-described kitchen is followed, being based rather on family than individual needs. Each subscriber receives in return for his or her subscription, a number of forms of recommendation for relief, in which certain particulars as to applicants' addresses, occupations, how many in family, &c., have to be filled up. These forms are registered at the institution, and each applicant then receives a card, entitling to two quarts of soup, and two pounds of bread three times a week. The soup at Ham Yard contains in every hundred gallons 100 lbs. of stock beef, cut into small pieces, and stewed with onions in a separate copper, afterwards filled up with water, and boiled for three or four hours. The stock costs from 4d. to 5d. per lb., being principally legs and shins of beef. While the stock is in course of preparation, two bushels of Egyptian lentils and half a bushel of onions, with one pail of rice, celery to flavour, salt, and pepper, are put into a second copper. Within about an hour and a half the lentils are dissolved. Next, the contents of the two coppers are admixed in a third, with water, the soup being thickened with a peck and a half of flour. If lentils cannot be readily obtained, pea flour or rice can be substituted. Lentils are exceedingly nutritious; containing, as they do, 26 per cent. of flesh-forming constituents, and 58 per cent. of heat-givers.

We have described at some length the processes of cooking used at each of these establishments, because we believe that similar ones, on a smaller scale of operations, would be started in different parts of the metropolis as well as in all populous towns, if local philan-

thropists were acquainted with the most economical means of administration. Of the different modes of preparation those practised at the Euston Road Kitchen are easier to carry out. In each instance, however, an admirable soup is made; though having regard to the valuable properties of lentils, we would suggest their partial substitution for a portion of the peas or of the barley, as used at the Model Soup Kitchen.

No one is more opposed to indiscriminate alms-giving than ourselves, but there is a wide distinction to be drawn between rendering much-needed assistance in kind to the deserving poor, and giving money to beggars who will promptly dispose of it in purchasing drink, or in some other worthless manner.

M. P.

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## THE CAUSES OF POVERTY.

By DR. C. R. DRYSDALE.

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THE first meeting of the Debating Society of the National Liberal Club was held recently, Mr. J. H. Levy occupying the chair. Dr. C. R. Drysdale opened a discussion on the causes of Poverty.

There were no doubt, said the speaker, many accidental causes of poverty in an industrial country like Great Britain, such as drunkenness, idleness, weak health, or bad education; but, just as the moon was known to be by far the most powerful agent in producing the phenomena of the tides, as compared with the sun or the planets, so the grand cause of poverty in this and other European states was over-population or an over-rapid multiplication of the human species. Plato, Aristotle, and writers in antiquity had seen this well enough, and several predecessors of Malthus also had understood the cause of poverty, but it was reserved for that author in his essay published

in 1798, to reveal to the world the true cause of poverty as clearly as Newton had shown the existence of universal gravitation. Plants and animals were gifted with an enormous capacity for multiplication; but myriads of germs never came to maturity. Thus a codfish was said to have millions of ova and yet only one or two of such ova would survive in the struggle for life always being carried on. Rabbits and cats could double their numbers so rapidly if provided with food that a few pairs of the former introduced into Australia had become tens of millions in a few years. A flock of sheep could double in  $2\frac{1}{2}$  years, a herd of cattle in three and a herd of pigs in two years, so that farmers could kill 40 per cent. of their sheep, 20 per cent. of their cattle, and 67 per cent. of their pigs without lessening the number of their stock annually. The capacity of doubling in the human being was very great. Sir Wm. Petty had calculated that the race might double in 10 years; and as a matter of fact, population had doubled by propagation in less than 20 years in the United States. A birth rate like that existing in modern Russia (48 per 1000) which was imitated by the district of Fulham in London, with a death rate like that of modern New Zealand (10 per 1000) would double the population in 18 years. This then, was what was meant by the virtual capacity for doubling of the human race; and from a consideration of the physiological properties of the human race this might also be perceived. Thus the human female began to be able to reproduce the species at the age of 15 and continued to do so up to the age of 45, which gave 30 years of reproductive power, during which any healthy woman might easily become the mother of from 15 to 20 children. As a matter of fact, many women had given birth to more than 20 children; and this explained how it was that after a plague such as occurred in London in 1666, so short a time elapsed before the population was as large as before the plague.

Room was suddenly made for numbers to

marry, and reproduction speedily filled up the gap left by the plague. In a country so long overpeopled as China, it was probable as Malthus has said, that it would be impossible for the population to double in any number of years, because food could never be obtained to sustain such a vast accession of numbers; whereas the United States with its fruitful soil had doubled its population every 25 years since the commencement of the 19th century. This tendency of mankind to increase was the super-eminent cause of misery among the instinctive classes at the bottom of society. These tried to increase, as fast as they would do in a new country; and the attempt led to starvation and the premature death of children and overworked adults. It would be possible, however to get rid of poverty if the race could make up its mind not to have a larger birth rate than was compatible with the obtaining of food supplies. France had a birth rate which had doubled the wages of labour since the time of the revolution, i.e., it was now only 22·5 per 1000 inhabitants, and in some of the departments as low as 14 per 1000. The West end of London, in Kensington district in 1888, had a birth rate of only 19·5 per 1000, whereas Bethnal Green had had one of 40 per 1000 in the same year. It was this high birth rate among the poor which was now the most important cause of sweating and early death, for the average age at death among the prudent classes or rich was now as high as 37 (Ogle) and not quite 30 in the artizan class of Lambeth (Chadwick). Every effort ought to be made by statesmen, clergymen, and the instructors of the people to explain to them that large families were incompatible in an old country with longevity or comfort. A family of four as a maximum, which would give about 3 as an average to each married pair, should be aimed at either by the establishment of societies of good parents, or by means of discouragements by the various states of the producing of large families, which, as Mr. J. S. Mill had suggested,

should be looked on in the same way in which drunkenness is regarded by the temperate. Poverty only existed because mankind followed their brute instincts without due consideration, but as the French and our own richer classes were now setting a good example in this matter, doubtless poverty was no longer to be regarded as an incurable malady. Bad distribution of wealth had really but little to do with the question, which was one of under production of sufficient food. And when poverty was once grappled with, many diseases would disappear by common hygienic prevention measures.

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## HYGIENE IN BREAD-MAKING.

BY WILLIAM JAGO, F.C.S., F.I.C.

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BREAD is the most important article in our national dietary; no apology is therefore needed for insistence on the closest attention to the principles of sanitation throughout the whole process of its manufacture.

The object of bread-making should be to convert the raw material supplied by the miller into bread, possessing the following qualifications:—

(1) The composition of the loaf should be such as renders it the best possible article of food for general consumption, obtainable from wheat.

(2) Such manufacturing processes must be selected as give the best results, and must be so controlled and regulated as to produce general uniformity of excellence.

(3) The conditions under which bread is made must provide for absolute cleanliness in every stage, and every precaution must be taken to ensure the manufacture being so conducted as to conduce to the health of the bread-consuming public, and also that of the working bakers.

Dealing briefly with these points in the order enumerated, we have first to study the composition of the loaf. This, of necessity is governed by that of the wheat, from which flour is prepared. The following table give the results of analyses of wheat flours, and other milling products, made by Clifford Richardson, Chemist to the Department of Agriculture of the United States Government, and published in an official bulletin. The whole of the products are throughout from the same grade of wheat, and therefore, are strictly comparable with each other. The samples were taken from the Pillsbury Company's Mills, Minneapolis, the largest milling enterprise in the world.

No.	Name.	Albu- minoids	Carbo- Hydr'ts	Fatty Mtr	Phos- Acid.
1.—Wheat and Whole Meal	14.35	70.37	2.74	0.82	
2.—Patent Flour	12.95	73.55	1.45	0.18	
3.—Bakers' Flour	14.81	69.99	2.00	0.31	
4.—Straight Grade Flour, being 40 per cent. No. 2, and 60 per cent. No. 3	14.11	73.41	1.78	0.26	
5.—Germ or Embryo	33.25	35.19	15.61	2.57	
6.—“Germ Flour,” being 1 part No. 5, with 3 parts of No. 4	18.89	63.85	5.23	2.12	

In discussing the composition of bread, far too much importance has been attached to the question of its capacity for sustaining life, when used alone as an article of diet. In the case of white bread especially, stress has been laid on its relative deficiency in albuminoids or flesh-forming materials, and mineral matters, principal among which are the salts of phosphoric acid. As a matter of every-day fact, bread is used by all classes as one constituent only of a mixed diet. The rich may obtain their further supplies of flesh and bone-forming materials from meat, while the very poor can purchase these same constituents of a perfect diet in the shape of peas and other leguminous vegetables, at even a less cost than bread. Milk, which is also rich in these bodies, is accessible to, and used by, all classes. Still, even if the necessity arose, bread is not so very far short of supplying in about the right proportions all the requisites of the human body.

Taking Church's estimate that albuminoids and carbo-hydrates are required in the proportion of 1 to 5, whole meal and the different varieties of flour quoted approach very closely to this ratio. It should be explained that millers divide their flour into so-called Patent Flour, a very white variety (No 2), and a darker residuum, called Bakers' Flour (No 3). The Straight Grade Flour (No 4) represents the average composition of the whole of the flour from the wheat. Both Nos. 2 and 3 are free from bran. The whole-meal contains less albuminous matter than the bakers' flour, while in both, the “ratio” is above Church's estimate of that necessary. In the whole of the flour from the wheat (No. 4) the ratio of the two is, for practical purposes, identical with the figure theoretically required. It has been estimated that an average man requires daily about 8000 grains of dry solid food, of which on the authority of Dr. E. Smith from 32 to 79 grains should consist of phosphoric acid. The consumption of 8,800 grains of each of the wheat preparations before described would introduce into the body the following respective quantities of phosphoric acid:—

No. 1.—Whole Meal	...	65 grains.
,, 2.—Baker's Flour	...	25 ,,
,, 3.—Patent Flour	...	14 ,,
,, 4.—Straight Grade Flour	21	,,
,, 5.—Germ or Embryo	205	,,
,, 6.—“Germ Flour”	169	,,

The whole-meal is richer in phosphates than is the flour, but, unless the bran be very finely ground, a large proportion of its contents is entirely unassimilated by the human digestive organs. There are very serious objections to finely grinding together the bran and floury portions of the wheat. Such a mixture does not possess keeping properties, and requires to be prepared immediately before use. The employment of whole-meal in a state of incipient decomposition would constitute a great source of danger to public health. The rejoinder may be made that to meet this difficulty the

precaution of grinding as required, should be adopted; but the exigencies of commercial baking render this course of procedure practically impossible. For sanitary and economic reasons we have to fall back on bran-free flour as the most suitable article from which to make bread. If necessity arose there would be no difficulty in adding phosphates to bread as salt is now added, these compounds being cheap and widely distributed.

The question arises whether the whiter or darker varieties of flour possess the greater intrinsic value. It will be seen that in composition they do not greatly differ. For reasons involved in the manufacturing processes, the very dark flours are not desirable. Further, the difference in colour between the whiter and darker kinds is largely a question of dirt. Some varieties of wheat, notably those of India, arrive in this country in a shockingly dirty state. The physical structure of the wheat grain renders it very difficult to clean.

There is on the one side of the grain a long "crease" in which the dirt lodges. In the more modern mills, elaborate machinery is fitted for wheat cleaning purposes, and during the various milling operations, the grain is split and then freed from crease dust. An improved mill means whiter, because cleaner, flour from the same wheat. Dirty-coloured flour and bread may have been made under conditions of absolute cleanliness; white flour and bread must have been so made.

It goes without saying that bread must be free from alum and all other adulterations; at present I believe that malpractices of this kind are of extreme rarity. It is a prevalent delusion that alum is used to whiten bread; as a matter of fact, its employment, now happily a thing of the past, was for the purpose of checking the further deterioration of the very damp and inferior flours, produced when only English wheats, of bad harvests, were obtainable. As forcibly remarked by Dr. Richardson, "Hence the inferior breads are more likely to be

charged with alum, than those made from the finer sorts of wheaten flour."

In the table of composition of wheat and flour, I have introduced that of germ, and also of what is known as "germ flour." The germ or embryo of the wheat is exceedingly rich in both albuminous matter and phosphates: owing, however to its diastasic activity, through which it rapidly induces objectionable changes in the flour, the efforts of modern milling have been devoted to the complete separation of germ and flour from each other. Until recently, the removed germ, notwithstanding its high nutritive value, has been comparatively useless. To Mr. Richard Smith, of Macclesfield, is due the credit for an invention which has successfully achieved the utilisation of germ. In the separated form, this body is subjected to the action of superheated steam, and by such treatment loses its objectionable diastasic character, without injury to its nutritive properties. At the same time it acquires a most pleasant sweet and nutty flavour. The prepared germ may be mixed with fine flour in any desired proportion, and then constitutes the "germ flour," one formula for which is given in No. 6 analysis. Bread prepared from germ flour is exceedingly rich in albuminoids and phosphates, possessing at the same time other valuable properties.

To insure the best possible composition of bread, all flours used should be systematically analysed and tested, and then blended in such proportions as yield the best loaf.

The selection of manufacturing processes must next engage our attention. Given wheaten flour, the baker desires to convert it into bread of a spongy texture and agreeable flavour. The means adopted for producing sponginess constitute the backbone of bread-making operations. This condition is universally obtained by the liberation of gaseous carbon di-oxide within the dough. The gas may be generated in several ways among which the principal are:—(1) Purely chemical re-actions,

as the action of either tartaric or hydrochloric acid on sodium bi-carbonate, mixed with the flour and water. (2) Mechanical means, in which a solution of carbon di-oxide is made in water under pressure, and then mixed, still under pressure, with the flour. On the pressure being released, the gas escapes from solution and aerates the dough. (3) Alcoholic fermentation, in the course of which carbon di-oxide is produced by the action of yeast on a portion of the sugar in flour.

The last method is adopted to the almost complete exclusion of the two former, a result in which practice is entirely supported and confirmed by theory. In any long-followed industry or custom it is interesting to note how nearly experience has taught mankind that which is best. Since roughly crushed grains of wheat were first used as a food, there has been an instinctive craving for the pure white nourishing part of the grain, separated as completely as possible from the husk or bran. We have seen how correct this instinct is. Not only in the selection of food, but also in the modes of its preparation, it may, with very few exceptions, be laid down that mankind will prefer that which is most conducive to its general health and well-being. The natural appetite may usually be trusted to fulfil its normal function of selecting food of the most suitable kind. The almost universal preference for fermented bread is in itself cogent evidence of its general superiority.

Without attempting to discuss the details of the fermentation process, the following great advantages may be pointed out:—In fermentation, gas is being continuously evolved in the dough, and in greatest quantity just at the time when most needed, namely, the first few minutes after the bread is in the oven. With other processes the whole of the gas is evolved as soon as the dough is made, and is continually being lost throughout the subsequent manipulation of the bread. But fermentation is justified on much more important grounds than these.

A common misconception is that yeast is simply employed in bread-making to produce aeration; in fact this is one of its least important functions, inasmuch as other agents can do the same although less efficiently. The albuminous constituents of wheat, known collectively as gluten, are naturally difficult of digestion. During fermentation, changes occur which result in the gluten being softened and probably partially peptonised. It is thus brought into a condition in which it is much more readily amenable to the digestive organs. As a result of properly conducted fermentation, the flesh-forming constituents of flour are to a larger extent assimilated by the stomach, and that with less digestive effort. The baker is thoroughly aware of the necessity for allowing fermentation to proceed sufficiently far to effect this change to the desired extent. Experience has taught him that otherwise his bread is harsh and raw to the taste, and "cold" to the stomach; in other words is comparatively indigestible. Accordingly the baker forces the greater part of the gas out of his dough, one or more times during fermentation, in order to allow it to get sufficiently "mellowed." The consequence is that in the fermentation process, flours from the more glutinous and nourishing wheats are employed in preference to those from the mere starchy varieties. Mechanical and chemical methods of aeration are devoid of this beneficial action on gluten, and accordingly in conjunction with these modes of bread-making, starchy flours containing the minimum of flesh-forming constituents are adopted. As a necessary result, fermented bread stands foremost in the matter of nutritive value, containing, as it does, flesh formers in higher proportion. At the same time, the act of fermentation produces a characteristic delicate flavour unattainable by any other means.

Among objections raised to the fermentation process is that it causes the loss of the constituents of the flour in producing carbon di-oxide gas, this loss having been estimated at

from three to six per cent. As the results of direct tests on sack batches of flour, the loss in weight of the dough is found to amount to from 3·5 to 4·0 per cent., which, however, consists almost entirely of the water lost by evaporation. In a direct experiment made by myself on a soft white flour, worked with about six times the normal amount of yeast, and fermentation carried on at a high temperature so long as any decided evolution of gas occurred, the maximum loss was found to be within 2·5 per cent., notwithstanding the abnormal severity of the conditions. Carefully conducted experiments on practical baking put the actual loss at about 1·37 per cent. On the principle of *ex nihilo nihil fit*, the carbon dioxide required for aeration must be produced from something, and I doubt whether any decided economy can be shown by any other method of introducing carbon di-oxide gas within bread.

It is sometimes stated that yeast may be impure and is uncertain in its action; this condition of things is unusual, and the evident remedy is careful and systematic testing. This being done, uncertainty in action is duly allowed and provided for. The temperature of the flour, of the water, the made dough, and that of the bakehouse, should be determined and registered. With the adoption of these simple precautions, allowances can be made for all the natural variations resulting from changes of climate and temperature. Certainly, the fermentation process is not so well adapted as others for the treatment of unsound flours; but no baker in England should have a sack of unsound flour in his bakehouse; this very weakness of the fermentation process necessitates vigilance on the part of the baker against unsound flour, and constitutes an important safeguard to the general public.

We next have to deal with the conditions under which bread is made. First, as to the building used as a bakery. This should, if possible, be entirely above ground, and is pre-

ferably not used also as a dwelling house. The various rooms should be lofty, well ventilated, and well lighted. Lavatory, and eating accommodation should be provided for the workmen in apartments entirely distinct from the bakehouse. All drains should be efficiently trapped and carried out of the building.

Next, as to bread-making processes; cleanliness or the reverse in these is independent of the nature of the processes themselves, and fermented or unfermented bread may both be made under perfect hygienic conditions. All operations on flour and dough, involving severe labour, should be performed by machinery. Thus, the flours should be blended in a proper machine, and then mechanically sifted, so as to remove pieces of twine or other similar impurity. While bearing testimony to the precautions for cleanliness adopted by the majority of bakers, I must, nevertheless, insist on the imperative necessity for the use of machines for the making of dough. That operation is performed in a heated atmosphere, and can only be accomplished by hand by men working hard in a semi-nude condition, in a stooping position, and usually in a state of profuse perspiration, over the flour and water which have afterwards to be eaten. Could the public once realise what I have faintly sketched they would, with trumpet voice, insist that this reform, at least, be straightway adopted in every bakehouse within the kingdom.

The dough having been weighed off into pieces for loaves, these may either be placed direct in the oven or may be moulded into any desired shape. If shaped at all, the shaping is the one operation that requires to be conducted by hand. But on a clean table, with workmen clean in their person, and dress, this operation, as deftly performed, is one of the most interesting sights of a well-appointed bakery. The amount and character of the handling is no more objectionable than that of the house-wife in cutting bread-and-butter, or the every-day operations of cooking in a

well-conducted kitchen. The shaped loaves have next to be baked, and for this purpose ovens should be used in which the heating furnaces are entirely without the bakery, so as to completely avoid the passage of coals and ashes through the rooms where bread is being made. The ovens should also be so arranged that neither smoke nor ashes, nor other products of combustion can find their way into the baking chamber itself. The baked bread should, as rapidly as possible, be removed from the bakehouse, and allowed to cool in a special room, well ventilated and cool in temperature.

A bakery fitted as I have described not only produces bread under conditions absolutely satisfactory to the general public, but also enables its workmen to follow their calling with comfort to themselves, and in a healthy fashion. The air in the workrooms is pure, free from flour dust, and moderate in temperature. The terribly fatiguing operations of dough making and flour mixing are performed for them. Further, no difficulty whatever arises in so organising the details of manufacture as to throw on no man a longer day's work than is customary in kindred occupations.

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## SHORT SIGHT AND SCHOOL CHILDREN.

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THE subject of short sight, or, as it is professionally termed, myopia, is one of much and increasing importance, if only on account of its greater prevalence, owing to various circumstances connected with school life.

In Germany, this defect of vision prevails to an extent fortunately not yet experienced in this country; so much so, that a picture of middle-aged or even younger Germans would not be true to fact if the artist had failed to depict many of them as wearing spectacles. This myopic condition is due, in very great

degree, to influences acting upon the sight during the period of life devoted to education; the same influences exist, more or less, in English schools, so that they demand thoughtful consideration and vigilant attention, and various important communications on the subject have appeared in different medical periodicals. One of the most complete, as well as the most practical of these, is a paper contributed some time back to the *Ophthalmic Review*, by one of its editors, Mr. Priestley Smith, Ophthalmic Surgeon to the Queen's Hospital, Birmingham, and Consulting Ophthalmic Surgeon to other large hospitals in the Midlands.

Of the several causes which contribute to the production of short sight, one of the most common is the excessive use of the eyes on near objects. This habit, particularly during childhood, and when accompanied by mental efforts, as in studying school lessons, is admitted by all who have given special attention to the question, to be the main cause of the alarmingly increasing prevalence of short sight.

Such being the fact, it is obvious that the most useful preventative measures,—“Prevention,” be it always remembered, “is better than cure,”—will be such as tend to keep young people from using their eyes too closely and too long in looking at near objects; and the next point to be considered is, How is this desirable end to be arrived at? Mr. Priestley Smith has solved this question by designing a portable slope for reading or writing, and a hygienic school desk.

It is, of course, an important matter that when at his work, the young scholar should sit in a comfortable position, so as to avoid undue bending or twisting of the spine, while his book is so placed that he can see it easily at a proper distance, thus preventing any strain on the eyes. This requirement receives attention in well-ordered schools, but up to a recent period the circumstance has been overlooked.

that boys and girls who, during the day-time, may have had every advantage in the way of hygienic school furniture, often work after school hours in the most uncomfortable positions. Yet, as Mr. Priestley Smith justly remarks, it is during the hours of evening study that proper arrangements are most necessary. After dark, the scholar has to work by artificial light; and, being more or less tired through the day's exertions, he is particularly apt to stoop and loll forward, while he is often under no special supervision. To counteract this difficulty, Mr. Priestley Smith has devised a simple and inexpensive slope for reading or writing, which can be placed on any ordinary table. It is manufactured in accordance with his directions by the Midland Educational Company. When it is used for writing it presents a smooth surface, seventeen inches square, with a slope of fifteen degrees, or slightly less; when employed for the purpose of reading, it is raised at the further part to an angle of forty-five degrees. The act of raising the slope in this manner forms a groove in which a book may be securely rested, thus obviating the trouble of holding the book in the hands. When the young scholar is engaged in copying from a book, or in using two books simultaneously, as in translating with the aid of a dictionary, the two angles can both be adopted.

The value of this slope is well shown in the accompanying illustrations, which were made use of by Mr. Priestley Smith, in a "Health Lecture" delivered at Birmingham. In this address the lecturer, dealing with the common causes of failure and loss of eyesight and their prevention, dwelt at some length on the avoidance of short sight, and exhibited by means of the magic lantern, (a most excellent method of impressing the youthful members and, indeed, all of his audience,) a series of pictures showing a schoolboy engaged at work in bad and in good positions. We append these, with their descriptions. It should be

mentioned that they were drawn with the help of photographs taken from life.

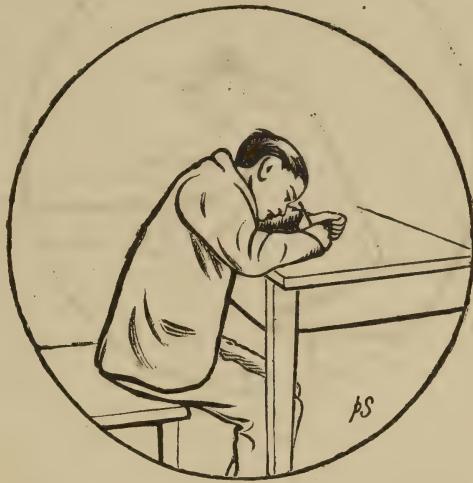


Fig. 1.

A bad but common position in writing; not the boy's fault. The seat is too low and too far from the table. The table is flat instead of sloping. The boy *cannot* sit upright or keep his eyes at a proper distance from his work.



Fig. 2.

A good position in writing. The back straight, the shoulders square, the work exactly in front, the eyes at least twelve inches from it.



Fig. 3.

A bad position in reading. The head much bent, the eyes much too near the book, for the same reasons as in Fig. 1.



Fig. 5.

A bad light; a small print; a difficult lesson  
The boy hopes to get the Latin Grammar into  
his head by putting his head into the Latin  
Grammar. He is doing his best, without  
knowing it, to make himself short-sighted for  
life, and is very likely to succeed.



Fig. 4.

A good position in reading. The book placed  
in a way which allows the boy to keep his  
head upright, and to sit comfortably in his  
chair.



Fig. 6.

Five o'clock in the afternoon "too soon to  
light the lamp." The good boy will not waste  
his time; he does his lessons by firelight.  
Perhaps, however, it is not a lesson book which  
he is reading, but "Robinson Crusoe" or the  
Boys' Own Book. If so, it is all the worse  
for he is less likely to put it down.

In devising the hygienic school desk the same principles have been observed as in the construction of the slope. Further, the following essentials are recognised.

1.—The seat should be of such height as will allow the scholar's feet to rest flat upon the floor or footboard, and broad enough to support the greater part of the thigh.

2.—The seat should have a back placed at such height as to fit the hollow of the young scholar's back below the shoulder blades, and to support the body in a vertical position.

3.—The near edge of the desk should be just so high above the seat that when the scholar sits square and upright with elbows to the sides, the hand and forearm may rest upon the desk without pushing up the shoulder.

4.—When used in writing, the desk should have a slope of 10 to 15 degrees (about 1 in 5), when used in reading, it should support the book at an angle of about 45 degrees, and at a distance of at least 12 inches from the eyes—16 inches would be better.

5.—When used in writing the desk should overhang the edge of the seat by an inch or two in order that the scholar need not stoop forwards, and that the support to his back may be maintained.

6.—Either the desk, or the seat, or some part thereof, should be so constructed as to be moveable when requisite, so that although the desk usually overhangs the seat the scholar may be able at any time to stand upright in his place.

7.—The desks and seats should be in various sizes, in order that the foregoing conditions may hold good for scholars of different ages.

All of the essentials which have been enumerated are fulfilled in Mr. Priestley Smith's hygienic school desk, and as the cost of manufacture does not exceed that of most of the old fashioned patterns,—moreover, in such an important matter, we must bear in mind the **maxim** that “the best is the cheapest.”—

its universal adoption should be only a question of time.

In addition to a more careful regulation of the postures in which school children sit, some system of supervision is desirable by which every case of defective sight may be detected, either at the commencement of school life, or at any time when the ailment may arise, so that the measures requisite to prevent further mischief may be adopted without loss of time. Attention has been directed to this matter in the House of Commons by medical Members, but Hygiene is not yet sufficiently recognised, nor are its important bearings on the public welfare sufficiently appreciated in our national assembly. Otherwise, when such a subject as the over-crowding of our large towns is brought forward, we should not have attempts to count out the House, and impatient efforts made to close the debate, so as to pass on to other business.

The recommendation made to the German Government by Professor Fuchs, an eminent German specialist, in writing on the Prevention of Blindness, is worth quoting in this connection—“The Government should appoint and remunerate medical inspectors for schools

..... It should be the duty of the medical inspector to inspect the special position in the class-room of such of the scholars as may require it on account of defects of vision: also, to prescribe glasses for such as need them, and no scholar should be permitted to wear glasses without previous proper medical examination. He should also indicate the cases in which certain subjects of study ought to be abandoned owing to defective sight, and communicate the necessary precautions to the parents of the scholar.”

Pending the possible “remote future” when all our schools are placed under systematic medical inspection, it is desirable that the principal of every school, or his assistants, should make it a part of his duty to test the eye-sight of all his pupils once in each year,

All the apparatus needed would be a set of test-types hung upon the wall of the school-room in a good-light, and a line drawn upon the floor, while no technical knowledge would be required. If any scholar should be unable to read given letters at a given distance, it would be self-evident that he was suffering from defect of sight, of some kind or other, and the teacher could then apprise the parents of the fact, so that they could take prompt steps to have the faulty condition remedied. Mr. Priestley Smith, from whom this sensible and easily executed suggestion emanates, has caused a set of "school test-types" to be printed and published by the same Company, to whom he has entrusted his other designs. There is no doubt that if the plan just referred to were adopted, much good would result from it. Incipient forms of defective vision would be quickly detected and remedied, and the general measures taken for the purpose of preventing short sight and other visual affections would tend to the benefit of the pupils both in their school-days and in their after-life.

W.A.

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## PATENT MEDICINES, No. 2.

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In our first article on this subject, published in the December number of HYGIENE, we commented upon the absurdity of applying the term "Patent" to quack medicines, which are permitted to be sold under the protection of a government stamp, while their composition is allowed to remain a mystery. Patents for new and useful discoveries carry with them the sole right of making, using, or selling those inventions for a limited period only; prior to obtaining the patent, the individual seeking it must deposit a description of the invention at the Patent Office, and subsequently he must

make considerable payments to prevent the loss of his privilege. On the other hand, in the case of quack medicines, the word "patent" is a misnomer and absolutely misleading; for, while any number of government stamps can be procured at three-halfpence each, the purchaser is left wholly in the dark as to the nature of the article which he buys. The consequence is, either that he may lay out his money upon a bottle of water, as shown by the analysis of Mattai's "Electrical Remedies," published in our December issue, or that he may unwittingly dose himself or some member of his family with the most potent drugs.

Judging by the numerous communications which have reached us, in connection with our first article, it is evident that the subject is one of general interest, and that thinking people are of accord with us, as to the urgent necessity of amending the law relating to patent medicines; many of these ask for further information. The field of patent medicines is so vast that we are at a loss to decide what preparation to take next—as a topic of discussion only, thank goodness! Well, we will deal with the first letter that comes to hand from a heap in front of us. It is from a lady subscriber who inquires, apparently with no small misgivings, whether she, being in delicate health, is right in continuing the use of Clarke's Blood Mixture.

Recollecting that this identical mixture was reported upon by Dr. Alfred Swaine Taylor, F.R.S., some years ago, we referred to the back volumes of the LANCET, and in that for 1875 we found, forming part of a letter headed "Quack Medicines," a copy of the "Report of analysis of a liquid described as 'Clarke's World-Famed Blood Mixture or Purifier,'" by Dr. Taylor, the late eminent analyst and lecturer on medical jurisprudence at Guy's Hospital. The examination of an eight-ounce bottle of the mixture showed the ingredients to be as follows:—Iodide of Potassium, 64 grains; Chloric Ether, 4 drachms; Solution of Potash,

30 minians; water, coloured with burnt sugar to give the requisite tint,  $7\frac{1}{2}$  ounces. The dose directed to be administered was one tablespoonful (half-an-ounce) four times a day. "Why such a mixture as this," says Dr. Taylor, "should be designated a 'blood mixture' and a 'blood purifier' is incomprehensible. It has no more claim to this title than nitre, common salt, sal ammoniac, or other saline medicines which operate on and through the blood by absorption. Its properties (i.e. those of Iodide of Potassium) are well known, and there is no novelty in its employment. The only novelty in this form of mixture is that the iodide is dissolved in water coloured with burnt sugar, and that it is described as a 'blood purifier.' The four doses directed to be taken daily represent 16 grains, and if the person taking it is not under medical observation, such a daily quantity as this may accumulate in the system and do mischief. In some constitutions the Iodide of Potassium frequently taken proves specially injurious. It produces iodism."

We have purposely quoted at some length from Dr. Taylor's report, partly because it emanates from such a high and unimpeachable authority, partly because the facts are stated by him with marked moderation.

As regards the deleterious effects of Iodide of Potassium, in unsuitable cases, or in long continued doses, all other medical authorities fully agree with Dr. Taylor. For instance, Dr. Sydney Ringer, physician to, and lecturer at, University College Hospital, writing about this drug in his "Handbook of Therapeutics," says that if its administration is continued for a long period, or if the patient manifests great susceptibility to its actions, iodism is produced; also that this condition may arise after very small doses. The parts chiefly affected in iodism are the eyes, the nose, the mouth, the stomach, and the bowels; there is also, sometimes a distinct skin eruption. Inflammation of the mucous membranes covering the eyes, running at the nose, a form of salivation

resembling that caused by mercury, purging, and nausea, with loss of appetite, all or some of these symptoms will then make their appearance. "A grain or even less," writes Dr. Ringer, "may affect the stomach;" moreover, he observes elsewhere, "Iodide of Potassium sometimes produces distressing depression of mind and body. The patient becomes irritable, dejected, listless, and wretched. Exercise soon produces fatigue, and perhaps fainting."

We could quote hundreds of similar proofs of the danger arising from the indiscriminate administration of this powerful drug which constitutes the basis of this so-called "blood mixture;" but, surely, enough has been said on this point to convince the most sceptical that Iodide of Potassium should never be given except in selected cases, and under the supervision of a qualified practitioner.

Yet the printed directions accompanying a bottle of Clarke's Blood Mixture which we recently purchased at the Drug Stores in Holborn, after recommending this preparation as a never-failing cure for a whole host of diseases, state that it is "warranted free from anything injurious to the most delicate constitution of either sex."

We will leave our readers to form their own opinion on this question. Before quitting the subject, we may mention in fairness to the manufacturer of this blood mixture, that the analysis of the bottle just referred to, made in the laboratory of Mr. Alfred W. Stokes, F.C.S., public analyst to Paddington, Bethnal Green, and St. Luke's, gives only 48 grains of iodide of potassium in the eight ounces. We venture, therefore, to infer that at some period subsequent to 1875, the manufacturer, out of deference to Dr. Taylor's views, diminished the quantity of this drug, so as to reduce the dose from 4 to 3 grains. It is a pity that the reduction was not carried still farther. Indeed, if the iodide of potassium had been omitted altogether, the warranty might have been given

on better grounds than now, while a corresponding increase of the water and flavouring matter could have done no possible harm to "the most delicate constitution of either sex."

W. A.

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## SEVENTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY, LONDON, 1891.

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THE Congress will be held in London this year, and will be opened by His Royal Highness the Prince of Wales, who has graciously accepted the post of President of the Congress, on Monday, August 10th.

These Congresses have been held biennially as a rule in various cities in Europe, the last of the series having been held in Vienna in 1887, under the presidency of His Imperial and Royal Highness the late Archduke Rudolph, Crown Prince of Austria, and attended by over 2,000 Hygienists and Statisticians from all parts of the world.

The aim of the Congress is to awaken public interest in the progress of Hygiene and Demography, by which latter term is understood the study of the life conditions of communities from a statistical point of view; to afford persons interested in these subjects an opportunity of meeting, with the object of advancing their progress; and by conferences and debates to illustrate questions relating to Hygiene, Demography, and Public Health.

Considering the fact that England has so long taken the lead in all matters connected with the progress of sanitary work, it was high time that the Congress should be invited to hold its session in London, and we doubt not, from the fact that the Prince himself will be its President, and from the numerous and influential general committee and delegates

from various public bodies and learned societies, as well as the representative character of its organising committee, the chairman of which is Sir Douglas Galton, K.C.B., F.R.S., that the forthcoming congress will be a great success.

It is very important that not merely the medical profession but the other professions closely connected with sanitary work, should take a practical interest in such a congress, and we are glad, therefore, to see that all the important architectural and engineering societies and institutions, as well as the scientific and other learned societies have appointed delegates to attend the congress.

It is obvious that such a congress cannot be successfully managed without a large expenditure, especially upon printing and postage, and it is thought that something like £5,000 or £6,000 will be required. In most other countries such congresses are subsidized by the government, but in this country these undertakings have not such assistance, and are obliged to depend entirely upon private subscriptions, and we would urge all who are anxious that the first International Congress of the kind which has been held in this country should be a success, to forward their subscriptions without delay to the honorary secretaries, W. H. Corfield, M.D., and G. V. Poore, M.D., at the offices, 20, Hanover Square, or to either of the bankers, Sir Samuel Scott & Co., 1, Cavendish Square, W., and Messrs. Dinsdale, Fowler & Co., 50, Cornhill, E.C.

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STREET ORGANS are the subject of a Bill of which Mr. Jacoby, M.P., has given notice, and that gentleman invites suggestions from sufferers and others, in the best way of dealing with the question. We would suggest the addition of a clause to the Bill, dealing with the nuisance created by the clanging of church bells at unreasonable hours, week-day as well as Sunday.

## HOW TO TREAT CORPULENCE

By DR. A. J. H. CRESPI, (late Editor of the Sanitary Review,) Wimborne.

THE treatment of obesity has long been one of the matters on which the widest difference of opinion has obtained. The doctors are not quite agreed; the laity have their own notions, crude, ill arranged, worthless, while the sufferer has his, and, sometimes his friends have theirs. Did you ever know a stout man who was a large eater? I never did, though I once met with a very decent young woman, nearly as broad as she was long, who candidly confessed that she had an *immense* appetite, but as for male sufferers admitting as much why they may eat three times the quantity that would suffice to keep a navvy in vigour, but they never eat too much, and at most they only reluctantly confess that they are *hearty*, What volumes that word 'hearty' may convey; seven huge meals a day, two gallons of malt liquor: no exercise, early to bed and late to rise, still it never means more than heartiness, perhaps hardly that. There is more in all this than at first meets the eye: food is fuel as well as building material: this most people do not seem to understand. In cold weather and in severe climates, much more fuel is required, and is thoroughly consumed too, than in an English summer. Active habits imply greater waste; hard work of course means a good supply: temperament has its share, but when little work is done, and the habits are inactive, a large appetite must lead before many years are over, to unpleasant consequences; in short to a growth in bulk at the expense of activity, utility, and enjoyment, though some people really seem to enjoy idleness and monotony, and are all the happier when they vegetate rather than live.

The young can eat a good deal too much, and they only pay the penalty in the shape of

an occasional so-called bilious attack, though what a bilious attack is I have never heard explained; the labouring poor may be hearty, but their heavy work burns off the excess of food, but in most cases the time comes when the excess of food is not carried off by a bilious attack, and then, if there is no work to burn up the supply, what happens? In some constitutions dyspepsia, in others an ever increasing bulk: now this bulk disinclines to exertion, so that with increase of bulk less work is done, while there is a growing disinclination to exertion: even a repugnance in extreme cases to any form of exercise; these cases are among the hardest the physician can treat, for the sufferer though he may wish for relief, lacks the energy to find it.

But I must qualify my statements a little. Some people never get fat, although they are hearty to a degree, and drink like fish; where the food goes I don't know, but eat what they will stout, they don't become: again, some people seem to have a fatal tendency to obesity on any kind of food; even the most rigid abstinence not being a hindrance. I have heard people remark that were they to eat one slice of bread and butter a day and drink a single cup of cold water they would get and keep fat; this perhaps, is not the rigid truth, but nevertheless, the fates are against them, sometimes, like the poor fellow who, from no fault of his own, failed in everything he undertook, and at last exclaimed in despair "had my father made me a hatter and given me the best business in all London, the very day I started people would have left off wearing hats."

Still as a rule stoutness is connected with errors of diet—errors of excess, perhaps oftener than people are prepared to admit, but often to errors of kind.

The lay public repose implicit faith in strong medicines, and of course, when plied vigorously, they do carry off a vast amount of semi-digested food, but they act by deranging the system, and so do a vast amount of constitutional mis-

chief. Other people resort to certain kinds of treatment, such as avoiding sugar and starch, fat and butter, others discard vegetables and keep to lean meat, but if excess in quantity is going on all the time, what does it amount to, while half a dozen pounds of lean beef steak a day, the regimen advocated by a certain school, can hardly be recommended as desirable in gouty subjects, and the sufferer might some day have to exclaim that the treatment had cured the original disease by substituting a far worse.

One thing is perfectly clear; no hard and fast rules can be laid down that will apply in all cases; the sufferer must place himself under proper treatment, he must go to a skilful practitioner, consult him, disclose his habits and tastes, be perfectly candid and aboveboard, and rigidly adhere for a sufficient time to the regimen proposed, sometimes supplementing it with suitable medicines, at others and more commonly taking none at all, unless under good advice.

A very curious work has just been placed in my hands called "*Food for the Fat*:" it is by Dr. Yorke-Davies, of Craven House, Northumberland Avenue, W.C. This accomplished physician seems to have made an exhaustive study of the subject, and to be taking it up as a speciality, that is, he is devoting himself to the treatment of obesity and dealing with it scientifically. Some letters from him in the medical journals recently attracted a good deal of attention, and an able friend has just told me that he was greatly struck by them, and considered that the author had got on the right tack, and that his treatment promised to do a great amount of good. The book is small and unpretending, and not technical, indeed it seems to be designed for general readers, and it is certainly not beyond their easy comprehension.

Dr. Yorke-Davies pleads that the average medical practitioner is not competent to treat obesity—not that the subject presents special

difficulty—but because he has not given sufficient intelligent attention to it: he has brought himself to regard an excess of too solid flesh as an ailment, an accident if you will. Now this is a mistake: common though obesity is, it is a misfortune, which deprives life, in extreme cases, of enjoyment, and makes the sufferer a burden to his friends not less than to himself. The ordinary general practitioner cannot be an oculist, an aurist, an operating surgeon, and a lunacy-expert in one: his *role* is sufficiently dignified, but it does not comprise all the parts in the tragedy of disease. For one thing, the field is so wide that he cannot occupy it thoroughly; he must restrict himself to a small part of it. With the development of modern scientific medicine one subject after another has been detached as it were, and the eye and the ear, the skin and the teeth have long been made over to different classes of skilful practitioners, who have found it more to their advantage, and still more to that of their clients to confine their attention to one matter—finding in it sufficiently profitable occupation. Surely too, I need not remind my readers that the internal organs of the body are being in like manner made over, one by one, to special groups of practitioners, and the results of this division of labour are manifest to all.

The stomach, at least its organic lesions, has long had its special ministers, who tend it and assist it with loving and untiring care in return for a consideration, which their *grateful* clients have usually been ready enough to pay. Unfortunately, the ministers of the stomach do not seem to agree better among themselves than do other doctors in general, and some of the letters which it was my privilege or pain to read in the British Medical Journal some time ago, rather startled me. Sir William Roberts, F.R.S., formerly of Manchester, now of London, a medical authority of conspicuous ability and great experience, urged that the constitutional inclinations should in all cases

be carefully considered, ascertained and followed; now this is precisely what the victims of obesity are in the habit of doing; and the result is patent to every one. So that on this point at any rate Sir William cannot claim to show his usual wisdom.

What is the light of nature forsooth? does it tell the glutton to hold his hand: does it warn the drunkard to pause? Light of Nature!!! why its rays are impotent to penetrate the dark places of the mind. Reason acting on experience tells what to do and what to abstain from. Do the lower animals know when they have had enough? Try them. They will eat till they fall gorged and surfeited: they go on till nature is exhausted and the inclination for food is gone from very satiety. The educated, civilized man is no longer the child of nature, he is guided by reason: he leads, fortunately for him, an unnatural life as far as he conforms to rules framed for his special guidance and based upon centuries of observation.

Sir Henry Thompson, another minister of the interior, although a skilful surgeon as well, in "Food and Feeding" ridicules the proneness of the unscientific public to advocate in all cases what has done them and theirs good. He remarks that it must always be distinctly borne in mind that every human being is unlike every other: his case must be carefully considered, its weaknesses ascertained, its strong points made out, and the regimen proposed must be that and that only, which suits the particular constitution. This is precisely what it seems to me that Dr. Yorke-Davies is doing so successfully—he is taking case after case on its own merits: prescribing for it in accordance with its idiosyncrasies, and not being satisfied with routine treatment or medication.

Corpulence is not a particularly rare complaint so that I believe that the new departure is meeting with ample reward and that the clients who write to, and still better, visit our distinguished author are not few, and are becoming more numerous every month.

We shall some of us perhaps live to see a great extension of this specialism, at any rate in the large centres of population: even Bournemouth, though quite a new and small place, just beginning to attract a few thousand visitors, during its all too short season, is getting its little band of specialists, and if Bournemouth is finding the advantage of specialists, what may not be the case in larger places like Brighton, Hastings, Cheltenham, and Clifton? Every organ will have half a dozen doctors for the residents to choose from, while the great cities like London will have small regiments of specialists, and of this the metropolitan 70 oculists are a proof.

This is the age of specialism, and no wonder, for specialism is only a medical term for the division of labour: experience tells us that division of labour is best for all: more work is done and better done, when the undivided attention is given to sharpening the point of a needle, putting the finishing touches to the joint of a pair of scissors; filling decayed teeth or peering down the throat. The same experience, which leads to this division of labour on the railways, in shops, in factories, and on board ship, has taught the disciples of Galem in their scarcely more useful and not always more difficult calling to divide their forces, and to occupy their attention with one matter alone. Why not? the selection of food, and the treatment of obesity seem trifling enough, but they are not so: they demand the ripe judgment, the trained eye, the sympathetic ear, and the skilful cross-examining tongue. In spite of possible ridicule and bitter professional opposition, let the new departure have fair play; it will be for the good of all, both patients and doctors: for assuredly as the eye, and the ear, and the skin are better understood and better cared for now that each has its specialists, so will the corpulent, whether from their own indiscretion or from hereditary tendencies, or from accident, or ignorance, or disease, be likely to have wiser and more successful treatment, and Dr. Yorke-Davies, who is we fancy the first fully qualified

medical specialist in this line, will find himself followed by a goodly body of disciples, who will reap a golden harvest, and, without hurrying their clients into their graves, banish obesity from the land by teaching them how to live and what to take to keep the bulk of the body from reaching undue dimensions. I heartily recommend my readers to get the little volume and to read it carefully: their labour will not be wasted.

I have written to very little purpose if I have not made it clear that obesity, though not a disease at its commencement, generally ends by becoming a disease fully as serious and not less certainly fatal than many complaints generally regarded as far more critical. Like other ailments it needs wise care and deep thought, but it repays tenfold all the time and attention given to it, because it is usually well within the reach of art. Dr. Yorke Davies has drawn up certain simple forms, which the sufferer fills up accurately, and which convey to the Doctor the precise information which he requires, and this guides him in the particular treatment demanded by the case under observation.

But I must pause, only remarking that the progress of the arts admits of the relief of obesity, in a way impossible till recently. Why, the introduction of saccharine is a boon of priceless importance; it enables food to be pleasantly sweetened without any of the dangers attending cane and beet-root sugar, and this is only one step in many.

The object the physician has before him, is to relieve obesity pleasantly safely and quickly, and this he is now able to do, when the patient will submit for a sufficient time to the remedies and regimen, which the study of the matter have shown to be efficacious.

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THE LONDON WATER CONSUMPTION in November was 171 million gallons daily. Of this quantity more than half, viz., 86 million gallons came from the Thames. It is quite time many will think, that the Metropolis had a better and purer supply.

## THE ART OF COOKERY.

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SOME people may be said to live—more is the shame to them—to eat; the rest of mankind find it necessary to eat, to live; but we will promptly dismiss the former class from consideration as unworthy of any further notice than a passing shrug of contempt or a look of disgust, and deal with our subject from a rational point of view.

Food is a primary necessity of existence, and must, by reason of the construction of the human frame, and the constant need of renovation or reparation of the used-up tissues, occupy some share of the attention and time alike of the untutored savage, and of the individual of the highest intellectual culture. Diet is a secondary matter, yet equally important with food itself; and cookery is the useful art which enables us to not only meet our daily requirements, but also to make the most of the varied articles of food with which Nature has provided us.

It has often struck us that the part played in our life—history by cookery is greatly underestimated. If we are about to set out upon a long journey or to undertake some more than usually trying task, do we not see to it that we preface our day's business by making a good breakfast? If we wish to obtain a favourable issue to some interview of importance, do we not hope that we may drop in upon the individual whom we have to see about the time when a satisfactory meal has mollified his disposition, and brought out all the amiable traits in his character? And what is most likely to effectuate this desirable condition of things? Certainly, good cookery. We shudder as we think how many an act of injustice, how many a cruel deed, must have found its origin in bad cookery.

Again, with regard to that vital question, Health. Thousands of men wander about, vainly trying to do the work which Providence

has allotted to them, dyspeptic, irritable or melancholy (according to their temperament) and wholly unfit for their ordinary avocations, all through bad cookery ; men who, had their food been properly prepared, would be in just the opposite to their present state ; who would have been bright, lively, and energetic, instead of being dull, inanimate, and listless. One of our great writers has pointed a moral (in cookery) by the assertion that, in the "good old days," when men, women, and even children, were hanged for the most trivial offences, many a human creature has undergone the extreme penalty of the law because the judge had fared badly at breakfast, or in other words, was suffering from the consequences of indifferent or bad cooking. For additional illustration of the appositeness of the views we advance, our readers have but to take from their shelves a volume of any distinguished novelist, and wherever domestic felicity is depicted, they will not fail to find that good cookery engenders good humour and puts a man at his best. The meal, frugal it may be, but well prepared ; the cleanly room ; the table duly arranged for the occasion ; the family group ready to do justice to the viands placed before it ; everything to insure the realization of the Shakespearian grace, "Now, good digestion wait on appetite ; and health on both."

In view of the great advancements made of late years in the art of cookery, and the consequent cultivation of more fastidious, indeed luxurious, tastes, we must not lose sight of the grand fact that the secret of good cooking is *economy*, in the best sense of the word. A good cook will turn to full account all the materials placed at his or her disposal, whereas a bad cook, owing to ignorance, is constantly guilty of the folly and crime of wastefulness. In proportion as food is wasted, so, it may be truthfully said, the poorer classes of the community are robbed. But how often, alas, do the poorer classes lay themselves open to the charge of self-robbery !

Let us suppose, for instance, that we place a couple of shillings in the hands of the wife of an artisan or a labourer, and suggest that she should lay it out in providing a dinner for herself and her husband. Nine times out of ten, the probability—we had almost said the certainty—will be that she will go straightway to the butcher, that she will disburse nearly the whole of the money in the purchase of a steak or a chop ; that after getting the meat home she will bake or grill it till it is half black and almost as destitute of moisture as the dish upon which it is placed, and that when her husband returns she will place this almost repulsive looking mass of overdone meat on the table with a few watery potatoes, or it may be, with the accompaniment only of a piece of bread. Compare this unappetising, unsatisfying meal with the savory, nutritive repast which a French-woman would concoct at a similar outlay !

As a matter of fact our national loss of provisions, not through wilful waste, but through woful want of knowledge, is enormous ; it is almost incalculable. We cannot imagine any way in which a benevolently disposed lady could more advantageously occupy her spare time and energy, or advance the interests of the working classes, than in instructing their wives and daughters in simple cooking and domestic economy.

We trust that from the foregoing remarks it will not be supposed that we hold the lower ranks alone to blame in this respect. The food wasted, because improperly cooked, in many a middle-class kitchen would go far towards sustaining a family of humbler position. As we ascend higher in the scale, the wilful destruction of partly-consumed articles going on in many kitchens is no less astounding than true. More food is destroyed through ignorance and carelessness than could possibly be made away with through gluttony.

We get so much more technical education now for boys (our future men), that it is desirable that something more should be done to fit

our future women for domestic duties. Through the lack of proper technical training in cookery, many thousands of young women enter into the matrimonial condition without the faintest knowledge of how to prepare a simple meal, or even how to purchase the necessary articles for it ; in other words, they can neither lay out the household money to the best advantage, nor cook the food when it has been bought.

Mrs. Greenup, Examiner to the South Kensington School of Cookery, has pointed out in an interesting article on this subject, which appeared some time ago in our columns, that the necessity of teaching girls how to cook is not confined, as many seem to think, to girls belonging to the class from which our domestic servants are mainly taken. As Mrs. Greenup says, those who get to service have the chance of learning household duties. But, how little have other girls who are engaged in the various handicrafts in which women find employment, or who earn their living behind the counter ? Take, for example, the hundreds of thousands who are employed by drapers and other establishments in the metropolis and all our large cities and towns. They never so much as see any cooking or household work done ; still less have they the opportunity of practically initiating themselves in such matters. The natural result is, that when they come to have homes of their own (the great aim of every young woman), they have not the faintest idea how to manage them, and how to keep them thoroughly clean and healthy ; while, as to domestic economy or cooking the simplest dinner, that is wholly out of the question. Mrs. Greenup gives the following illustrative anecdote :— A prepossessing young shopwoman, who had been for some years in her situation, married a respectable and fairly well-to-do clerk. A lady customer, whom she had frequently attended to in the shop, took a friendly interest in her, and after a little time called to see how she was getting on in her new home. The lady was not less sorry than astonished at

hearing the young wife relate her difficulties. “John,” she said, “is very fond of fish, and a day or two ago he brought home a very nice cod fish. I did not know any other way of cooking it, so I *hung it on the spit and let it roast*. John made a fuss at dinner time because the fish did not taste right. I wish that I had been taught cooking when I was a girl ! ”

There are many, very many ladies throughout the land, anxious to assist those who are in less fortunate positions than themselves, and ameliorate the condition of their humbler neighbours, without wounding their natural sensitiveness, or lowering their feeling of independence. In no way could they do more good of a lasting character, than by the establishment of cookery schools and classes, in which might be taught plain cooking, and domestic economy. Moreover, they could avail themselves of the opportunities which would be thus afforded for showing how essential is a vegetable diet for the maintenance of health, and how many excellent and satisfying dishes may be prepared at a small cost, without the outlay of an unduly large proportion of their weekly earnings on “butchers’ meat.”

W.A.

## BRITISH HEALTH RESORTS.

### No. 11.—THE UNDERCLIFF, ISLE OF WIGHT.

BY W. H. HALL, M.B.

FOR some years back there has been a general tendency for the British Invalid Public, if I may so say, to wander to foreign climes in search of health-resorts suited to their different ailments, but there now seems to be a reaction setting in, due, perhaps, to the very variable weather experienced abroad for the last few winters, and also to some extent to the earthquakes and other internal disturbances, which have so frightened invalids that they are now

beginning to think more seriously and more honestly of the good things they have nearer home. It might be said that this is the view taken by proprietors of spas and health-resorts; what is it from the invalid side of the question? Well, it must be admitted that hitherto the accommodation, means, and appliances in use for treatment, at places on the continent have been better than at similar ones in this

country, but that cannot remain an excuse, for all these are now carried on with as good style and skill here as on the continent. I might mention a few of the ailments for which invalids go abroad, and also the names of a few resorts usually recommended for their treatment, and thus show some proof of the above remarks:—

DISEASES.	CONTINENTAL HEALTH RESORTS.	BRITISH HEALTH RESORTS.
Anemia, (due to its innumerable causes.)	<p><i>Thermal.</i> Gastein, 95°-114° Johannishbad, 86°, Teplitz, 95°-112°.</p> <p><i>Salt water.</i> Homburg, Kissen-gen, Kreutznack, Baden-Baden.</p> <p><i>Chalybeate.</i> Schwalbach, Spa, Flinsberg, St. Moritz.</p>	<p><i>Thermal.</i> Buxton, 82°, Bath, 100°-120°.</p> <p><i>Salt water.</i> Droitwich, Harrogate, Leamington, Cheltenham, Woodhall.</p> <p><i>Chalybeate.</i> Tunbridge Wells, Harrogate.</p>
Gout	Carlsbad, Homburg, Aix-la-Chapelle, Eaux Bonnes, Royat, Enns, Baden-Baden.	Harrogate, Leamington, Bath, Moffat & Strathpeffer (Scotland) Llandrindod and Builth (Wales), Lisdinvarna (Ireland).
Chronic Rheumatism	Aix-la-Chapelle, Aix-les-Bains, Wiesbaden Teplitz.	Bath, Buxton, Leamington, Strathpeffer.
Chronic Bronchitis, Emphysema, Bronchial Asthma, Chronic Pharyngeal and Laryngeal Catarrh.	Lisbon, Madeira, Malaga, Nice Palermo, San Remo.	Bournemouth, Hastings, Torquay the Undercliff (Isle of Wight).
Early active and the quiescent forms of the later stages of Phthisis, Chronic Pleurisy, Convalescence from Pneumonia.	Cannes, Upper Engadine, Pau, Mentone, the Oberland, San Remo, Spezia.	Bournemouth, Brighton, Hastings, Torquay, the Undercliff (Isle of Wight).
Chronic Dyspepsia, Chronic Hepatic disease, Chronic Endometritis, Pelvis Cellulitis, Chronic Dysentery.	Hyères, Pontresina, the Pyrenees St. Moritz.	Hastings, the Undercliff (Isle of Wight).
Convalescence from acute Nephritis and all forms of Chronic Bright's disease but especially Catarrhal Nephritis for which warm dry climates are indicated.	The Riviera.	Brighton, Folkestone, the Undercliff (Isle of Wight)

Now, all these have their respective merits but I have only to do here with the Undercliff (Isle of Wight.)

Although the Undercliff is such a well-known place, most people who have not visited it seem to have a very vague idea as to what is really meant by this name. It is that portion of the south coast of the Isle of Wight extending from Luccombe (East) to the little village of Blackgang (South West), seven miles in length, varying from a quarter to nearly one mile in breadth and includes Dunnose, Bonchurch, Ventnor, St. Lawrence, Niton, St. Catherine's Point, and Blackgang, with the famous Blackgang Chine. It consists of an irregular table land, or rather a succession of terraces, backed up by a chalk wall of unequal height, and raised 50, 60, and even 100 feet above the sea level. Certain internal agencies, land springs and hidden waters, at work since the dawn of life and light upon the world, have resulted in the separation of this strip of land from the hills of which it was formerly a part, and the removal of it bodily to a considerable way below them, between them, in fact, and the sea. To understand the cause of this subsidence, it is necessary to be acquainted with the geological nature of the rocks, and the influences to which they have been subjected. The strata reckoning from the lower are, first, red ferruginous sand; then blue marl; next green sandstone; and at top chalk and chalk marl. The stratum of blue marl is soft and easily acted upon by land springs, when it becomes mud, and oozes out; and the sand stone and chalk being deprived of their support must of necessity sink down. The subsidence, if thus brought about, might be gradual and scarcely perceptible except in its ultimate results; but the sea was at the same time beating with violence against the lower strata, and washing out the sand and marl, which was already loosened by the springs. The double process would go on till the superincumbent mass became unable to sustain itself by mere adhesion to the parent rock, when

it must necessarily break away and fall forward. That this is the way in which the Undercliff is produced, is evident from an examination of the phenomena it presents, and what may be observed still going on, though on a lesser scale. The great change in the level must have occurred at a very distant period; churches and houses of ancient date, which stand in different parts of the Undercliff, show that no considerable alteration can have taken place for centuries.

The Rev. James White speaks of the Undercliff as:—" Consisting of a platform varying from half a mile to a quarter in width, bounded on the south by the undulating bays and promontories of the Channel, and on the north by a perpendicular wall of grey rocks, which form the buttress to a range of downs of almost mountainous elevation. It unites two of the principal constituents of a noble landscape. But when, with its guardian hills and ever varying ocean, we remember the richness of its vegetation, the clearness of the air, and the wild seclusion of its innumerable dells, the glowing expressions of enthusiastic tourists would seem not much, if at all, beyond the truth. In addition to its beauty, the district has acquired within a few years another and better claim to admiration. The peculiarity of its position guarded from the east and north by a barrier of rock, the mildness of its air, and the extraordinary dryness of its soil, have made it a chosen spot for the invalid, and a refuge from the attacks of the English destroyer, or, at least, a soother of the English disease—consumption."

Lord Jeffery, of the *Edinburgh Review*, writing of the Isle of Wight, says: "The chief beauty of the island lies on the south where it opens to the wide ocean, and meets a warmer sun than shines upon any other spot of our kingdom. On this side it is for the most part bounded by lofty chalk cliffs, which rise, in the most dazzling whiteness, out of the blue sea into the blue sky, and make a composition something like Wedgwood's enamel. The cliffs are in

some places enormously high—from 600 to 700 feet. The beautiful places are either where they sink deep into bays and valleys, opening like a theatre to the sun and the sea, or where there has been a terrace of low land at their feet, which stretches under the shelter of that enormous wall, like a rich garden plot, all roughened over with masses of rock, fallen in distant ages, and over-shadowed with thickets of myrtles, and roses, and geraniums, which all grow wild here in great luxuriance and profusion. These spots are occupied, in various parts by beautiful ornamental cottages, designed and executed, for the most part, in the most correct taste. Indeed it could not be easy to make anything ugly in a climate so delicious, where all sorts of flowers, and shrubs, and foliage multiply and maintain themselves with such vigour and rapidity. The myrtles fill all the hedges, and grapes in festoons from tree to tree, without the assistance of a wall."

The mean annual temperature is  $51.9^{\circ} 72'$ ; and as a result of eight years' calculations, it has been shown that the warmer and more genial winds blow here for the greater portion of the year. Thus:—S.W., 96 days; E., 60 days; N.E., 54; W., 52; N.W., 30; S., 26; N., 24; and S.E., 18.

After quoting such high authorities it is needless for me to dwell on the undoubted beauties of the Undercliff, or its climate, especially when I mention that the heliotrope, myrtle, fuchsia, stocks, and roses bloom in the open air throughout the winter, but let me point out to what class of patients it is of value. Although it is an undisputed fact that patients suffering from phthisis, in all stages of the disease, benefit by a visit to the Undercliff, still it must not be supposed that they are the only ones who should go there, on account of the extreme dryness, but at the same time stimulating character of the air. Those suffering from chronic bronchitis, chronic pharyngeal and laryngeal catarrh convalescence from pneumonia, gout, chronic pleurisy, and the different

forms of Bright's disease, will derive benefit, while in some parts, due to the mountainous character of the air, patients suffering from emphysema, and asthma will find a welcome change. In the summer months too, those suffering from chronic dyspepsia, hepatic, and all forms of uterine, disease, anaemia, debility and failure of nerve power will find the Undercliff well suited to their ailments.

## PRISON DIET AND PRISON LABOUR.

BY A LATE PRISON SURGEON.

THE existence of a sound mind in a sound body is universally admitted as necessary for individual well-being, and, such being the case, any conditions which affect the bodily health of those who have shown symptoms of moral disorder, are of great practical importance to the community. Among these conditions the dietary on which criminals are maintained, as compared with the labour they perform, is a subject of general interest.

In order to perceive clearly the bearing of the subject, it is desirable to glance first at the characteristics of the criminal class, and at the forces by which they can be acted upon. In regard to the first point it will be generally admitted that the great characteristic is weakness. It is not excess of spirit, but defect of energy, that in the immense majority of cases makes the criminal. Feeble bodies, mis-shapen heads, dull faculties or weak minds, are the rule, and not the exception, within the prison cell; and the almost constantly noted "deficient education" among those whose crimes have brought them into custody, ranks them as men mainly of a sensual quality, with a ruling fear of bodily suffering, and a ruling love for the gratification of their appetites. They need therefore some impetus to exertion,

some motive which, appealing to the senses, shall overcome their want of energy and draw out their capacity for labour, and simply act in repressing their tendencies to crime. Of the forces available for the treatment of such a class the chief are—religion, labour, solitary confinement, corporeal punishment, and low diet. Now, of these, religion has but feeble power, or the men would not be criminals ; labour, except when useful, occupies their limbs alone, and leaves their minds free to follow the train of their own degraded thoughts and to indulge their feelings of resentment against Society's vengeance,—such as it appears to them ; solitary confinement gives them still further scope in this respect, and, if in the dark cell, shuts them out completely from every beneficial influence by which a better current of ideas may be awakened in their minds ; corporeal punishment is unavailable for many and can only occasionally be inflicted on any ; the quality and quantity of the food by which they are to be supported is, therefore, the greatest and most constant power for acting upon them.

Such an estimate, regarding food as a key to the position, may be deemed exaggerated, but it must be remembered that only those things can be classed as rewards or punishments which the individual for whom they are intended appreciates in those capacities ; the child is only influenced by appeals to its senses, and criminals whose intellectual state is usually little better than that of children, need to be treated in a similar manner. Moreover, other inducements, which have been proposed or offered as incentives to their good conduct, are less direct in their action. The hope of working off part of their term of imprisonment, is a remote one (especially if their sentence is very long), and feeble of action, in proportion to its distance ; the permission to earn a small amount by working overtime, is an incentive that could only influence the industrious and thrifty, and would fail to move those who,

feeling no immediate need of money, are content with the support at present afforded them ; but the prospect of dinner is never far distant from their thoughts, and the desire to improve its quality and quantity commends itself to the lowest natures.

In order, however, that a Prison Dietary may exert its full influence on the criminal, his food needs to be offered as a reward, as well as withheld as a punishment, otherwise it affects his fear of its deprivation alone ; this may act beneficially, yet fear is the lowest possible motive of abstinence from ill-doing, and in all human matters it is also the feeblest of all. Almost any passion, for instance, avarice, love, jealousy, revenge—will at times render it inert. It is also a motive which, as all experience shows, cannot be kept constantly before the mind without deadening the impression at first produced ; therefore, no matter how severe any prison discipline may be, or however much the criminal may at first dread the deprivation of a portion of his food, there will come a time when such severity or such deprivation will cease to influence, and some other fresh force must be appealed to. If, however, the hope of earning better rations by diligence in work be added to the fear of losing a meal through idleness, such a system would be an hourly incentive to toil, that could not fail to make its influence felt. Prison discipline would thus become a system of rewards and punishments, instead of being merely punitive, and by its being by such means assimilated to all other methods for acting upon human motives, it would tend to produce a feeling in the criminal that his punishment was not simply Society's vengeance for his misdeeds, but was meant for his reformation.

The dietary table at various prisons may be arranged in five classes. In class 1, generally the diet of the first week, the breakfast and supper consist of 6 to 8 ounces of bread, with or without  $1\frac{1}{2}$  or 2 ounces of oatmeal mad-

into a pint of gruel; while dinner will usually consist of  $\frac{1}{2}$  lb. of bread. Class 2, from the end of the first week to the end of the first month; dinner, 8 to 12 ounces of bread, with a pint of soup once or twice a week, and perhaps an ounce of cheese one day, and  $\frac{1}{2}$  to  $\frac{3}{4}$  lb. of cooked potatoes on two or three other days; breakfast and supper as in class 1. Class 3, during the second and third months; in this the prisoner receives for dinner during the weeks usually two pints of soup, 6 oz. of cooked meat,  $3\frac{1}{2}$  lbs. of bread, and 3 or 4 lbs. of cooked potatoes; sometimes three pints of soup are given. The meat is not often of larger amount. In class 4, for the second three months of incarceration, a pint of soup is given thrice a week, and 4 oz. of meat thrice (or 3 oz. four times) with a little increase, as a rule, in the bread and potatoes. In class 5, comprising the remainder of the period of the prisoner's sentence, the allowance of soup remains the same as in the foregoing class, an extra ration of meat is sometimes given, about 1lb. of cooked potatoes per diem, and 6 or 8 oz. of bread. The soup is generally directed to contain in every pint 3 oz. of cooked meat, 3 oz. potatoes, 1 oz. of barley, rice or oatmeal, and 1 oz. of onions. The diet varies somewhat in different prisons, but the preceding will serve as an average description.

The most frequent methods of punishment adopted in Great Britain are the crank and the tread-mill; and while it is impossible to ascertain the amount of force exerted in performing the different kinds of productive labour, that which is needed in these unproductive forms of punishment can be better estimated.

On the tread-mill, the men usually work in spells of fifteen minutes, with five to fifteen minutes' rest. Taking the height ascended at 14,580 feet, and the average weight of the prisoners at 128 lbs., their day's work amounts to lifting to a height of one foot 1,866,240 lbs., or 833 tons, 2 cwt., 96 lbs. A deduction must however, be made, which I believe would not

exceed one-fourth of this, to allow for the diminished labour which results from the prisoner holding, as is the custom, by each hand alternately to a horizontal bar.

In the crank-method of punishment, the labour varies with the number of daily rotations, the pressure at which it is worked, and the stature of the individual, enabling him to work the crank in an easy or a constrained position. Taking the revolutions required daily at 14,400, the pressure being 10 lbs., and the radius of the handle 12 inches, the day's work would amount to lifting to a height of one foot 904,780 lbs., or about 404 tons. To this, however, an addition which I have reason to believe would not exceed 86,400 lbs., about  $38\frac{1}{2}$  tons, must be made to allow for the force exerted in following with the body the movements of the crank.

According to Dr. Parkes' and Dr. Edward Smith's works on Hygiene, a man engaged in ordinary or routine labour, requires daily from 3,500 to 5,600 grains of carbon, and from 250 to 350 grains of nitrogen in his food; when in more active labour 6,800 grains of carbon, and nearly 400 grains of nitrogen. So that it may be fairly estimated that a prisoner on hard labour would need more than 5,000 grains of carbon and 350 grains of nitrogen each day; and according to this calculation, some of the classes mentioned fall short of the proper amount.

Practice helps to confirm these theoretical deductions. It is stated by Dr. Wilson, in his Handbook of Hygiene, concerning the convicts at Portland, that those employed in the more arduous kinds of labour, such as navvy work, almost invariably lose a great deal of weight, and my own observation of those incarcerated at the prison with which I was connected, tends to a similar conclusion. The prisoner therefore leaves prison less able, and consequently less willing to work, than when he entered it. Nor is loss of weight the sole effect of scanty food for whilst insufficient nourishment is afforded to

the tissues, various ailments, such as a disordered digestion, skin diseases, &c., are apt to result.

It is not to be denied that some prisoners gain in weight, but these are usually tramps, who have been living how and where they could until their arrest, or men whose vicious habits had led them to irregular hours for meals and sleep, with frequently deficient food; yet the fact remains that others lose considerably, and that, (so far as my experience goes), there is an average loss in all the three lowest classes of diet.

It may be urged that these facts are admitted, and not only so but were designed to exist as they do, in order that by low diet the vicious might be deterred from crime. My answer is, that whether designed or not, the result is physically injurious, and the system based upon misconception of the truth. The Scripture rule, if a man will not work, neither shall he eat, is sound and proper; but to enforce work while withholding the needful food is not a course sanctioned by that maxim, being rather a doing of physical evil that moral good may come—a course which Englishmen are not wont to justify. To deprive of privileges, not of necessities, is the true system of punishment, while at the same time, endeavouring to induce attempts at reform, by the hope of such gratifications as the man can estimate.

The following conclusion may, therefore, be submitted as a fair one:—that a diet consisting of the coarsest materials, claimable only when the required work has been performed, and just sufficient in amount to keep the prisoner in health under the allotted task, with the opportunity of gaining by diligent labour a better and more abundant supply of food, would do much more than the present system to reform the criminal, and would lay the foundation of industrious habits, thus accustoming him eventually to take such a pleasure in useful employment as should turn him away from his vicious courses, and be his safeguard

against further transgression. Bodily needs being thus made subservient to moral hygiene the prisoner need no longer, as now, be physically harmed by his imprisonment; the guardianship of public morality would no longer tend to impair public health; and by employing food to recompense as well as to punish, we should use far more efficiently than now, one of the strongest levers by which to move the world of crime.

### Reviews and Notices of Books.

**AFTER MANY DAYS.**—By J. Johnson Leak, London: Beaumont & Co., 61, Charing Cross Road.—1s.

This novel, the scenes of which are laid in the north of England and the Isle of Man, sustains its interest from beginning to end. The principal characters go through various vicissitudes and trials, but as all comes right at last, “After Many Days” has good claims to the title which Mr. Leak, who is well-known as a writer in this field of literature as well as a journalist, has bestowed upon it. The moral is good, like the plot, and the book is one which everyone could read with interest and pleasure.

**“JUGGINS,” a Dog’s LIFE.**—By H. S. M., London: Beaumont & Co., 61, Charing Cross Road.

This little sixpenny book, illustrated with a full-page engraving of the sagacious animal whose eventful career it describes, comes out opportunely at this season of the year, when all the boys and girls are at home from school, and a difficulty sometimes occurs in finding amusement for them. At such moments, Juggins, who amongst other canine occupations, has played an active part in circus performances, cannot fail to amuse and occupy the youngsters’ attention with the graphic account of his numerous adventures.

## Notes and News.

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**A KINDLY ACKNOWLEDGMENT.**—The Right Hon. W. E. Gladstone, M.P., writing to acknowledge the receipt of Vol. III of HYGIENE, says—“A glance at the volume shows that it must contain much matter worthy of attention.”

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**THE ADULTERATION OF FLOUR** has become a fine art down in Delaware, U. S. A. The bark is peeled off white beechwood logs, which are next submitted to the action of a powerful cutting machine, shaped somewhat like a pencil sharpener, furnished with half-a-dozen keen knives. These revolve at the rate of 200 to 300 revolutions in a minute, so that the log is very soon cut into very fine shavings. These are thoroughly dried, put into a hopper, and ground in the same manner as wheat. The man who invented this wholesale swindle must be one of the Russian army-contractors, who supplied the soldiers in the Russo-Turkish Campaign with black bread composed of saw-dust admixed with flour.

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**A NEW HEALTH RESORT IN ITALY.**—An English syndicate has been formed for the purpose of converting Frascati, which is the ancient Jusculum of Cicero, into an international health and pleasure resort. The Premier has stated that this syndicate would have the support of the Government.

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**WHAT ARE BRITISH DAIRY FARMERS DOING** that Denmark should be able to find a sale in this country, last year, for 677,398 cwt. of butter, while France in the same period sent us 566,524 cwt. of the same commodity. The import of cheese from abroad during the twelve months was no less than 1,907,999 cwt. of cheese.

**THE METROPOLITAN GARDENS' ASSOCIATION** appeal to the benevolently disposed for £3,000 to enable them to lay out as a recreation ground eleven acres of land, known as Victoria Park Cemetery, and situated in one of the most densely populated parts of the East End of London. It is the intention of the London Council to acquire this ground, and to extinguish the rent-charge now payable on it, (how the members of the late Metropolitan Board of Works must wonder at the philanthropic spirit of their successors!) But, desolate-looking wilderness as the place now is, a sum of £3,000 will be required to adapt it to its future purpose, and we hope that the Association, will not be long in raising that amount for so laudable a purpose.

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**THE MEAT IMPORTED INTO GREAT BRITAIN** in 1875 represented a ratio of only 1lb. to every family of five persons. The recent returns of the Board of Trade show that the annual imports, chiefly from America and Australia, now amount to 40lbs. of “dead meat” for every such average family of five persons. The largest import of live cattle into England yet received, took place in the same year.

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**THE SCOTCH CROFTERS' GRIEVANCE** was referred to in our columns some time back, and we then pointed out that all this industrious race wanted might be summed up in two simple items:—1.—Land sufficient to enable them to support themselves and their families by their labour; 2.—At a less exorbitant rental than hitherto. We specially mentioned Lady Matheson's estate, in support of our argument, we have pleasure in writing that the Crofters' Commission having just finished their investigations into this particular estate, in the island of Lewis, have decided in favour of a reduction of 33 per cent. in the annual rental, and an abatement of 77 per cent. as regards arrears.

A WELL DESERVED TESTIMONIAL was presented on December 18th at Leeds, to Dr. G. H. L. Rickards, one of H. M. Inspectors of Factories, on the occasion of his retirement from the office of Inspector for Yorkshire, which he had held for the long period of 32 years. An admirable and complete abstract of the Factory and Workshops Acts, past and present, from the pen of this gentleman, appeared in a recent number of HYGIENE. The testimonial took the form of a portrait, painted by a Leeds artist, Mr. C. W. Fowler, with a handsome service of silver plate, the total value reaching nearly £300, which amount was raised within about a fortnight, merely by circulars sent out by the Committee, no one being personally canvassed. This fact, with the lauge attendance of factory owners at the Leeds Town Hall, where the presentation was made by the Mayor of Leeds, on behalf of the subscribers, must have been specially gratifying to the recipient of the testimonial.

A RARE DISH.—A London paper says:—“A baker in Maryport received, as a dish to cook for a Christmas dinner, three dressed hedgehogs, for a party of gipsies who were encamped in the neighbourhood.” Either those gipsies were very degenerate, or they did not understand Romany cookery. It is some years ago *now*, since the editor of HYGIENE was a happy schoolboy, wandering about the Warwickshire lanes whenever he had a holiday, spending much of his spare time in the fascinating company of the gipsies, (they were gipsies in those days, not the miserable half-costermonger, half cadger race of the present period) and occasionally partaking of their hospitable fare. The way in which they cooked a hedgehog was as follows:—After carefully preparing it, they covered the dead animal (spikes and all) with a thick envelope of wet clay; next they placed this clay ball in the midst of the embers of a wood-fire. After a time, when the hedgehog was cooked,

the clay cracked in various directions, and the ball was removed from the embers. The clay covering was easily removed, bringing away with it all the spikes and leaving only a delicate white ball of flesh, having a flavour between that of roast chicken and pork; constituting with a “tot” of nut-brown ale, a dish fit for an epicure. Before any squeamish readers have time to turn up his or her nose at this novel dish, we would ask whether they have ever eaten the flesh of duck or pig, and to contrast the simple fare of the hedgehog, which subsists upon roots and insects, with the indiscriminate food of the other animals that we have named.

SPECULATIVE BUILDERS' MORTAR is composed of anything that comes handiest and most economical to the jerry-house constructor, such as road-scrapings mixed with a little lime, and other makeshift ingredients. In a recent case of infringement of the bye-laws of the Garston Local Board, heard before local magistrates, one of the witnesses described the mortar used by the builder who had been summoned, as “composed of loam mixed with slack lime,” and further testified that such a compound was “totally unfit for building purposes, being calculated to make houses unhealthy.” Another witness gave evidence that the inner walls of the semi-detached villas erected by the delinquent builder, were constructed of broken, defective bricks. Nemesis, in the shape of a high wind, speedily overtook the builder, and reduced the villas to “a most wretched state.” Of course, the defendant and his witnesses tried to show that the houses were built in a proper and workmanlike manner, but the magistrates thought otherwise, and imposed a fine for the breach of the Board's building regulations. How many thousands of such houses there are in the suburbs of London and most English towns. Who can tell?

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## CYCLING AND ITS USES.

By Dr. ALFRED J. H. CRESPI, Wimborne.

CYCLING is rapidly becoming an almost universal accomplishment, and not long ago the Speaker of the House of Commons said that there were 600,000 cyclists in the three kingdoms. I can remember, when in residence at Oxford, a college tutor named Charsley (brother of Mr. Charsley, the blind principal of Charsley Hall) showing me an invention of his, a *Velociman*, which was worked by the hands, the rider sitting in a low, comfortable seat. The machine was very heavy and clumsy, and the labour exhausting. My friend had in early life, before taking orders and becoming a college don, been a civil engineer; he had, consequently, a good knowledge of mechanics. I induced another friend of mine, Mr. Charles Marshall, of Birmingham, an eminent engineer and a very practical man, to run down to Oxford and inspect the velociman, but he condemned both machine and principle. Still the velociman continues to be made, and perhaps it has been improved. The year before making the acquaintance of Mr. Charsley, when living in Dublin, I had seen bicycles on Stephen's Green, tearing along at, it was said, twelve or fourteen miles an hour; but few people then expected much from tricycles and bicycles, still fewer ever

expected to ride them. How changed all this is: machines of the lightest and best construction are being made in enormous numbers, while prices are falling decidedly, so that I suppose it would be no exaggeration to say that a good bicycle can be got at half the price asked a very few years ago, and as progress is rapid and continuous, we may look for still greater improvements and much lower charges.

Tricycles are now so light and easy that very little practice is sufficient to enable any ordinary person of medium weight to work them rapidly, and almost without effort. Practice makes perfect, and with practice conscious effort is hardly appreciable, so that at least sixty miles can be done with as little exertion as ten on foot, or twenty on the easiest of horses. Tricycling has opened up a new pleasure to a vast number of people, and brought within easy reach distant places which, a few years before, they could only get to with great labour and expense; now they mount their tricycle and run off from ten to fourteen miles and back again in four hours, and feel none the worse for their exertion.

Many people think that the labour of using a tricycle is excessive, and quite pity the poor rider. The other day I was met by a gallant cavalry captain—not a tricyclist. I don't think that I seemed distressed, nor was I labouring greatly, but, looking at me with evident commiseration, he exclaimed, "That is hard

work," just as though I was painfully pushing a barrow full of coals up a steep hill.

Hints are not of much service to the beginner. He must practice, and with perseverance soon makes wonderful progress; the difficulties of guiding a machine, and of going up and down hill, vanish, and the feeling of exhaustion, at first almost too severe to be borne, passes away, and a practised rider covers thirty or forty miles, and is scarcely tired, nor is he the least bit stiff the following day. My friend the Rev. R. A. Chudleigh, has, in the following excellent passage, said nearly all that can be said about tricycling as far as beginners are concerned. "Most of what is written on cycling," he remarks, "seems addressed to one or other of two extremes—the mighty athlete or the health-seeking convalescent. The following hints are for beginners whose skill and strength are neither more nor less than ordinary. Most of the rules, such as to go slowly round a corner, may be left to common sense; but there are a few catches in which danger does not strike one beforehand, and is usually learnt by disagreeable experience, though easily avoided if indicated previously. The time of chief peril is when going fast down hill; if the brake-power be insufficient, or the steering gear get disorganised, and yet, if one *must* pull up because of some danger in the way, it should be remembered that one can always pull up quickly by dropping everything and laying one's hands and arms on the tyres of the two wheels. This need only be adopted when matters are serious, and the choice seems to lie between a skinned hand and a cracked skull. When going down hill lean forward if the steering wheel be in front, but lean backward if it be behind to throw weight on the steering wheel, for, unless that wheel has a firm hold of the ground, a cycle at full speed does not follow its guidance, especially when loose stones or inequalities of the road toss up the steering wheel so that it makes long bounds in the air. When going

fast down hill a sudden jolt will often throw the feet off the treadles, which, if revolving rapidly, are not easily caught again; do not attempt to catch the treadles, lest the attention, becoming concentrated on them, be diverted from the steering, the consequence being that the cycle, as quick as thought, deviates into the ditch. On losing the treadles, put the feet on the rests, and apply the brake, but keep the attention fixed on the steering. A very fertile source of spills is looking back over the shoulder, for the hand unconsciously turns with the head, and the cycle charges at the fence on the same side as the shoulder over which one is looking. I have observed all these causes of accidents. The length of run, which is safe for a lady, should be measured by her own sensations rather than by miles. On a smooth road with a fair wind the exertion required is almost nothing, but with a rough road and a head wind the resistance is great, and progress is like ploughing. A lady's chief aim in cycling should be to avoid over-exertion or painful strain; directly she feels distress, especially at the base of the spine, she has done too much. Ladies must remember that their peculiar peril in cycling is overstrain, and any attempt at performing feats, or breaking records, is likely to end in breaking something far more valuable than a record. With beginners, the fatigue-point is soon reached, especially in the knees; but as use and practice advance the fatigue-point recedes. In choosing a lady's tricycle I would make some sacrifice of speed to secure gain in power. What is called a good climber is to be preferred; not that a lady should aim at working up steep hills; it is good economy, both for herself and for her machine, that she should dismount and push if the ascent be at all stiff; but a good climber implies great lever power, and it is a law of mechanics that gain in power means loss in speed, and it is far more important for a lady that her tricycle should run easily than rapidly. I should hesitate to recommend any maker by

name, but I can suggest the far better plan of hiring different tricycles for an occasional day or hour, and finding out by actual trial the pattern that combines most advantages. As to the saddle, I cannot believe that for man or woman perineal pressure can be other than injurious. From the anatomical standpoint the narrow saddle seems wholly indefensible. The ischial bones, and not the perineal structures, are designed by nature to support our weight; therefore, I advise that, at any rate for ladies, the popular saddle be discarded in favour of the broad seat. With regard to clothing, as in all other active exercises, flannel should be worn next the skin. The dress must not be full, and need not be inordinately long if tapes be used. I recently saw a lady on a tricycle, and another lady on a horse, careering in the neighbourhood of Onslow Square, and I must confess that the cyclist was, from every point of view, the neater, the more graceful, the more elegant. Drink if you are thirsty. There is no virtue in a parched throat, nor the least need to endure the miseries of thirst, which sanitarians afflicted with water-horror prefer to drinking. At the same time one can easily train oneself to drink water excessively, or to do a great deal of hot work on wonderfully little fluid."

Mr. Chudleigh, it will be observed, prefers a broad seat to the popular and, as most people deem it—and I cannot think but rightly—more convenient and easier saddle. This matter I cannot discuss here, though he will find himself in a very small minority. He also maintains that in an emergency one can always pull up dead by putting the hands on the tyres firmly and fearlessly; the hands certainly get a little cut and scratched, but no more. This piece of advice, only to be carried out in an emergency, has disturbed the equanimity of many reviewers and newspaper critics, who have made very merry over Mr. Chudleigh's advice. He is right, and his critics are wrong: the cycle can be promptly and safely stopped dead, and Mr. Chudleigh is not the only person

who has proved the truth of this fact. It is well to be sure of one's fact, certainly, but reviewers and critics should also be certain of theirs.

So far I have mainly dealt with tricycling, because everyone can tricycle, while to country folk with books and parcels to carry long distances a good heavy tricycle, to which thirty or forty pounds can be suspended, is an enormous boon. Tricycles of marvellous lightness are also now made, which literally fly along the ground, but which, from the lightness and peculiarity of their construction, will not admit of heavy parcels being attached to them—strong, however, to a degree unsuspected by the uninitiated, they will stand any amount of wear and tear, and will carry a heavy rider, without fatigue, forty or fifty miles at a stretch—indeed I do not like to give figures and times, for they would to many of my readers seem exaggerations. It may truthfully be said that to a country doctor or a clergyman living in a good country with fairly level roads the gain is above all calculation. Two hundred miles a week can be traversed without effort and with very little expenditure of time—in fact, a tricycle often takes the place of a horse and carriage.

All classes can tricycle, and most can bicycle without a particle of danger; true, if the heart is badly diseased the risk should not be faced, but varicose veins of the legs and feet, when properly supported, as such veins should always be, by an elastic stocking, are no impediment, and in young people troubled with varicose veins from a sedentary life, the exercise actually does good, and is a curative agent of the greatest value.

Among the improvements of the future Dr. B. W. Richardson has suggested that in going down long descents it is just possible that the surplus energy might be stored in some way so that the rider should climb the next acclivity by its assistance. My own impression is, that before long we shall have tricycles and bicycles,

at first of course expensive, fitted with electric apparatus—some adaptation of the Faure accumulator possibly—and by its means the rider will guide himself anywhere he likes, even going up hill without exertion and with very little slackening of speed. Everything that economises labour is a gain, and though when reservoirs of stored-up electricity can be purchased at so much the dozen and attached to the machine, few people will trouble to use their own legs, but will prefer the tireless agent which the march of science has placed at their command, I apprehend that there will not be any very great impediment to overcome, and that before long we shall see machines in all directions driven by electricity and simply guided by the rider.

Tricycles are rapidly becoming valuable economic agents; many country postmen use them, and I often see one in particular returning from a long round sitting low down in his machine and half concealed by a miscellaneous collection of parcels, large and small, light and heavy. To carry heavy weights the machine must be strong, and speed must be in the main sacrificed, but I fancy that a strong man, used to tricycling, could easily get along at five miles an hour carrying himself and from seventy to one hundred pounds of encumbrances.

Let me, as an experienced cyclist, urge elderly, stout, or inactive people not to over-exert themselves on any pretext. Tricycling is pleasant and health-giving on good, hard, level roads, in warm but not hot weather, and when not pushed to excess. Any person fairly used to the exercise, whatever his age or figure, can go five miles an hour for two hours at a stretch, and then after a brief rest return and be very little tired. But on bad, loose, hilly roads, and at high speed for long distances, matters are wholly different, and instead of its being an easy and safe amusement, it becomes highly dangerous: a degree of waste of the muscular tissues is set up beyond that which the system can eliminate, and an attack indistinguishable

from rheumatism is the result; and this applies to excess in any outdoor exercise. These remarks do not apply to the young, active, and strong, to adepts, and to persons accustomed to constant exercise. I sometimes hear of people stopping *here* for tea, who have run from the other side of London in the day—say, 120 miles—that is excessive in anyone, and not to be recommended. To show what can be done on bicycles and tricycles by practised hands will interest the reader. On the track, twenty miles an hour have been done on the bicycle, and over sixteen on the tricycle; while on a level, hard road, eighteen have been done on the former and fifteen on the latter, and on bad hilly roads twenty-five miles have been done at a stretch, at the rate of 4 min. 15 secs. per mile. Seventy miles a day have been easily covered on a tricycle for thirteen days in succession, and one hundred on a bicycle. But this is nothing to what some athletes have accomplished. Mr. Marriott once did 183 miles in a day; he subsequently beat his own record by going 219, and Mrs. Allen covered 153 in twenty-four hours. With reasonable practice six miles an hour for six hours is no great effort, but, as in all other athletic exercises, the strain increases out of all proportion to the increase in the pace. Double the speed means six times the strain and waste; the man who can cover six miles an hour safely for six hours is soon exhausted by nine miles, and, when he reaches ten or eleven, learns that his system is strained to the uttermost, and he breaks down in half an hour.

But say what one will about tricycles, it is generally agreed that the time comes when the practised rider wants a bicycle, and now that the latter are being made so light, safe, and easy, they can be learnt in a few hours, and considerable dexterity can be acquired in a week. The “Geared Facile” seems to be having an enormous run upon it; fitted with cushion tyres, and made on the latest principles, it leaves nothing to desire, while I believe the net cost

price is only £17 1s. This is admitted to be one of the best machines now in use. Mr. Chudleigh, after several years of tricycling, has now also set up a bicycle, or, rather, a gentleman in this neighbourhood, to whom he had done many kindnesses, forced on the reluctant rector of West Parley a bicycle, as some little recognition of the invaluable services he had received at the rector's hands. Much that Mr. Chudleigh wrote on tricycling still holds good, but he would probably have to supplement it with as much on bicycling and its superior safety, ease, and speed, for, strange to add, and contrary to the usual opinion, bicycling is safer and pleasanter than tricycling. For a long time after beginning to cycle I kept to a heavy tricycle, weighing 100 lb. I could get over eight miles an hour, and could do forty miles with little fatigue; then I felt that something lighter and quicker was needed, and I obtained a machine weighing about half as much; this was a bicycle steerer. Less convenient for carrying parcels, it was better adapted to climbing steep ascents, and hills of some length and abruptness, and I found I could with a little practice run up easily and comfortably. Again I have advanced; I found that, though getting to be an expert cyclist, I could only with extreme difficulty keep up with friends on bicycles, and this winter I have obtained a Geared Facile. Before doing so I took the opinion of several friends, and of a good maker, and they spoke so highly of its finish, lightness, and advantages, that I have followed their advice. A friend told me that, a day or two before, he had run forty miles, from Bournemouth to Winchester, in less than four hours, without fatigue, though over bad stony roads. This friend is not a professional rider, only a hard-worked business man, who rides for convenience, not pleasure, though cycling gives him a great deal of pleasure.

I cannot refrain, although at the risk of wearying my readers, from dwelling on the utility of cycling—that is, in the enormous advantage it gives over riding, driving, and

walking. True the train goes faster, but you may have to walk several miles to the station, while, when you reach your destination, you may have several miles to go from the station to your goal; but on a cycle you start from your own house, and go direct to your journey's end, without any delay. I can truly say that I go long journeys to places twenty miles off which I could not reach by train. Near this very town, with its important junction, there are villages fourteen miles from any station. I can cycle to them without expense in two hours, and in almost any state of the roads. Again, horses and men are most costly, and though one can ride anywhere easily enough, the cost would soon reach a figure that would buy a dozen of the most costly cycles ever made. A clerical friend said to me in September that he would rather walk ten miles than cycle one; and I have heard that another gentleman preferred walking twenty to cycling one or two. Now, to a practical cyclist this is just as silly as though a man, who wanted to send a telegram thirty miles, announced that, after all, he preferred walking with the message himself.

Very likely many of my readers will be disgusted that I seem content with eight miles an hour, and a distance of forty miles at a stretch, but a very busy man, like myself, has no time to make cycling his occupation. I take it up on account of its utility, its saving of time, and its advantages, and not to break records. But to satisfy those people who fancy that some notable feat should be recorded, I will tell them what the Geared Facile has done and can do. A race was run a few years ago from Anderton's Hotel, Fleet Street, to Bath and back. Mr. Snook, the winner, covered 214 miles in twenty-four hours, while several other riders reached 200 miles. That was thought wonderful, and so it was. The following year Mr. J. H. Adams did 267 miles in a day; then Mr. H. R. Goodwin covered 2,100 miles in nineteen days; and now 297 miles have been done on the Geared Facile in twenty-four hours; while it may be

confidently asserted that any active, practised rider can do 50 to 100 miles at a stretch. Nay, accurate, twenty miles west of this town, bicycled from Salisbury home, nearly fifty miles, after a meeting, one evening last summer, easily, quickly, and safely. What more can anyone need?

The difficulty of learning to bicycle alarms many people, who fancy that a task is proposed equal in severity to that of becoming a good cricketer. I asked our local, excellent, and popular cycling agent, Mr. Frank King, how long it would take to learn to ride a Safety or a Geared Facile. "To ride well," he replied, "two or three weeks; but to learn to get on easily, one afternoon;" but one of his men told me he had known people learn to ride in a quarter of an hour, and get on quickly too; while a gentleman, whose knowledge of the machine is unsurpassed, writes me that he has taught middle-aged and elderly men, who had never been on a cycle of any kind before, to ride in an afternoon. It may, therefore, be confidently asserted that the modern low, easy, light bicycle can be fairly mastered in a few hours; a young friend says in half an hour. Can anyone desire anything easier than this?

Alcoholic beverages interfere seriously with long distance travelling. This every cyclist soon finds out if imprudent enough to take them. Mr. Marriott and a friend covered 180 miles in a day, and believed that they could have gone twenty miles further; they took no alcohol; but they were sure that had they taken stimulants they would have broken down early in the day. Cycle as much as you please, and drink cold tea and pure water in moderation, but don't touch that enemy of the race, alcohol, in any shape or quantity.

And this is what cycling has come to; and only a few years ago an eminent mathematician calculated that no machine could ever be constructed which would be of the smallest service to anyone. His figures were worthy of his great reputation, and yet now the rider carries his own weight, and that of the machine, and 100 pounds to boot.

### DR. KOCH ON HIS REMEDY.

(From the *Deutsche Medicinische Wochenschrift.*)

SINCE the publication of my experiences with a new remedy for tuberculosis two months ago many doctors have been put in possession of the remedy, and have thus been enabled to make themselves acquainted with its qualities by their own experiments. As far as I can judge by the publications that have appeared on the subject, and the letters addressed to me, my statements have, on the whole, found full confirmation. That the remedy exercises a specific action on tuberculous tissue, and can in consequence be employed as a very delicate and certain reagent in searching out hidden, and diagnosing doubtful, tuberculous processes, is agreed on all sides. And in regard also to the therapeutic effect of the remedy, most accounts agree that, in spite of the relatively short duration of the treatment, many patients show improvement, varying only in degree. In not a few cases I am informed that cure even has been attained. Only in some exceptional cases has it been affirmed that the remedy may not only be dangerous in too far advanced cases—which is freely admitted—but that it directly hastens the tuberculous process, that it is in fact harmful *per se*. I myself have had the opportunity during a month and a half of collecting further experiences regarding the therapeutic effect and the diagnostic value of the remedy in about 150 cases of various forms of tuberculosis, and I can only say that all I have lately seen is in harmony with my former observations, and that I have nothing to retract of what I have before stated. So long as the only point of importance was to judge of the correctness of my statements it was not essential to know what the remedy contains, and what its origin is. On the contrary, it was clear that subsequent experiments would be all the more unprejudiced the less was known of the remedy itself; but now that such experiments

in sufficient number have been made and have proved the importance of the remedy, the remaining task is to study the remedy beyond the application it has hitherto found, and if possible to make use of the principles which lie at the foundation of its discovery for other diseases. This task, of course, demands a full knowledge of the remedy.

I therefore think the right moment has come to make the necessary statements which follow, before I discuss the remedy itself. I think it imperative for the better understanding of its action to trace shortly the steps that led me to its discovery. If a healthy guinea-pig be inoculated with a pure cultivation of tubercle-bacilli, the inoculation wound generally becomes sealed, and seems to heal up during the next few days. It is only in the course of from ten to fourteen days that a hard nodule is formed, which soon opens, forming an ulcerating spot which persists until the death of the animal; but the case is very different if an already tuberculous animal be inoculated. The most suitable animals for this experiment are animals that have already been successfully inoculated four to six weeks previously. In the case of such an animal also the small inoculation wound becomes sealed at first, but no nodule is formed, a peculiar change taking place at the point of inoculation. Already, on the first or second day, the spot becomes hard and dark-coloured, and this is not confined to the point of inoculation, but spreads around to a diameter of 0.5 to 1 centimetre. During the next few days it becomes more and more clear that the epidermis thus changed is necrotic. Finally it is thrown off, and a flat, ulcerated surface remains, which generally heals quickly and completely, without carrying infection to the neighbouring lymphatic glands. Thus the inoculated tubercle bacilli act quite differently on the skin of a healthy guinea pig and on that of a tuberculous one. But this remarkable action does not belong exclusively to living tubercle bacilli, but also in the same degree to dead

ones, whether killed by low temperatures of long duration, which I at first tried, or by boiling heat, or by certain chemicals.

This peculiar fact having been ascertained, I followed it up in all directions, and it was then further found that pure cultivations of tubercle bacilli thus killed, after they have been ground down and suspended in water, can be injected under the skin of healthy guinea-pigs in large quantities without producing anything but local suppuration. Tuberculous guinea-pigs, on the other hand, can be killed by an injection of very small quantities of such suspended cultures, the time being from six to forty-eight hours, according to the dose; a dose which is just insufficient to kill the animal is sufficient to produce a widespread necrosis of the skin in the region of the point of inoculation. If the suspended matter be still more diluted, so that it is scarcely turbid to the eye, the animals remain alive; and if the injections be continued at intervals of one or two days, a noticeable improvement in their condition soon sets in; the ulcer at the point of inoculation becomes smaller, and finally cicatrises. This is never the case without such treatment. The swollen lymphatic glands become smaller, the condition as regards nutrition improves, and the progress of the disease is arrested, if it is not already so far advanced that the animal dies of debility.

These facts formed the foundation of a therapeutic method against tuberculosis. But an obstacle to the practical employment of such suspensions of killed tubercle bacilli was found in the phenomenon that the tubercle bacilli are by no means reabsorbed, nor do they disappear in any way, but for a long time remain unchanged in their position, producing smaller or larger suppurating centres. Thus it was clear that in this method the curative effect on the tuberculous process is obtained by a soluble substance, diffused, so to speak, into the fluids that surround the tubercle bacilli, and transferred without delay to the circulating fluids of

the body, whereas that which has the pus-forming quality seems to remain behind in the tubercle bacilli, or at any rate to be only very slowly dissolved. Thus the only important thing to be done was to carry out the process, which takes place within the body, outside of it also, and if possible to extract and isolate the curative substance from the tubercle bacilli. This problem required much work and time before at last I succeeded, by the help of a 40 to 50 per cent. solution of glycerine, in extracting the active principle from the tubercle bacilli. My further experiments on animals, and finally on human beings, were made with liquid thus obtained; and in this way also the liquid which I let other physicians have in order to repeat the experiments was obtained. The remedy with which the new therapeutic treatment of tuberculosis is carried out is, therefore, a glycerine extract of pure cultivations of tubercle bacilli.

Besides the active principle there pass from the tubercle bacilli into the simple extract all other substances soluble in 50 per cent. glycerine, and therefore there is found in it a certain quantity of mineral salts, pigment, and other unknown extractive substances. Some of these substances can be removed from it without difficulty, for the active principle is insoluble in absolute alcohol, and can be precipitated by it—not pure, it is true, but in combination with other extractive substances likewise insoluble in alcohol. The colouring matter, too, can be separated out so that it is possible to obtain a colourless dry substance from the extract which contains the active principle in a much more concentrated form than the original glycerine solution. But this purifying of the glycerine extract has no advantages as regards practical application, as the substances thus removed have no action on the human organism, and the process of purifying would therefore only cause unnecessary expense. The constitution of the active principle can as yet be only a matter of conjecture. It seems to me to be a

derivative of albuminous bodies, and to be in close relation to them, but it does not belong to the group of so-called toxalbumins, as it can withstand high temperatures, and in the dialysator passes quickly and easily through the membrane. The quantity of active principle present in the extract is in all probability very small. I estimate it at fractions of 1 per cent. Thus, if my assumption be correct, we have to deal with a substance, the action of which, on the tuberculous organism, far surpasses that of the strongest drugs known.

Various hypotheses may, of course, be formed as regards the specific mode of action of the remedy on tuberculous tissue. Without in any way affirming that my view is the best possible explanation, I imagine the process to be as follows: The tubercle bacilli in their growth produce in the living tissues—just as in the artificial cultivations—certain substances which have various but always deleterious influences on the living elements of their surroundings—the cells. Amongst these substances is one which, in a certain concentration, destroys living protoplasm and causes it to undergo a transformation into the condition called “coagulation-necrosis,” by Weigert. The tissue having become necrotic, the condition is so unfavourable to the nutrition of the bacillus that it is unable to develop further, and finally in some cases it dies off. In this way I explain the remarkable phenomenon that in organs freshly attacked by tuberculous disease—for instance, in a guinea-pig’s spleen or liver filled with grey nodules—numerous bacilli are found, whilst bacilli are rare or entirely absent when the enormously enlarged spleen consists almost entirely of whitish substances in a condition of coagulation-necrosis, such as is often found in guinea-pigs which die of tuberculosis. A solitary bacillus, however, cannot produce necrosis at a great distance, for as soon as the necrosis has reached a certain extent the growth of the bacillus—and, in consequence, the production of the necrosis-producing substance—diminishes, and

thus a sort of mutual compensation steps in, and to this it is due that the growth of isolated bacilli is so remarkably restricted, as, for example, in lupus, in scrofulous glands, etc. In such cases the necrosis only extends over a part of the cell, which then, in its further growth, assumes the peculiar form of a giant cell. I thus follow in this statement of my views the explanation of the growth of giant cells first given by Weigert. Now, if the necrosis-producing substance were artificially added to that contained in the tissue surrounding the bacillus, then the necrosis would extend further, and thus the conditions of nutrition of the bacillus would be much more unfavourable than is usually the case. Then, not only would the more completely necrosed tissues disintegrate, slough, and—where this is possible—take with them the enclosed bacilli, carrying them outward, but the bacilli would also be disturbed in their growth to such an extent that they would die off much sooner than is the case under ordinary conditions. It is in calling forth such changes that, to my mind, the action of the remedy seems to consist. It contains a certain amount of the necrosis-producing substance, of which a correspondingly large dose has a deleterious influence—even in healthy persons—on certain elements of the tissues, probably on the white blood corpuscles or cells closely related to them, thus giving rise to the fever and the whole peculiar complex symptoms. In tuberculous persons a much smaller quantity suffices to cause at certain spots—that is, wherever tubercle bacilli vegetate and have already impregnated their surroundings with the necrosis-producing substance—a more or less extended necrosis of cells with the accompanying symptoms affecting the entire organism. In this way it is possible to explain—at least for the present—in a provisional way the specific influence which the remedy in certain well-recognised doses exercises on tuberculous tissue, as well as the possibility of increasing the doses

in so remarkable a fashion, and, finally, to explain the curative effect which the remedy undoubtedly possesses where the circumstances are at all favourable.

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### ONLY MEASLES!

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By Dr. R. LAWTON ROBERTS, Ruabon.

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ONCE again this old-fashioned, contagious fever—measles—is very prevalent. It has made itself felt rather awkwardly too, since it has broken up many pleasant domestic arrangements, interrupted much school work, and, it is to be feared, encroached somewhat on the festivities of our boys and girls this Christmastide. To be sure, it is “only measles,” and does not carry with it the terror of scarlet fever or of diphtheria; yet, withal, it produces a mild scare, for everybody knows that it is catching; and though we country folk do not take much account of it—it is only measles, you see—still, even in us rustics, in our heart of hearts, there is a lurking fear—not confessed, mind you—that the baby, or some weakly one of the little flock at home, may suffer from it. There have been odd rumours about too, and statements in the newspapers, that several deaths from measles have occurred in our large towns; but the old women say it is all stuff and nonsense, and even the minister tells us that silly mistakes are made every day by those newspaper men—even by *Truth* itself.

The present outbreak has caused much vexation of spirit amongst the juveniles, interfering with their holiday plans, and much consternation among anxious parents, and those in authority over schools, upsetting, as it necessarily has done, divers arrangements for improving the youthful mind, the polishing and cultivation generally of “the young animal.”

Yet we should not be surprised. The present outbreak has come about its usual time. All

the different contagious fevers show themselves more prominently, according to their kind, at one or other particular season of the year. The tide of pestilence rises and falls, ebbs and flows—now during one month, then another—according to its special variety. Typhoid, for example, increases during the autumn (hence its *alias*, autumnal fever); small-pox makes its mark specially during the first six months of the year; whooping-cough tends to develop in the spring; whereas measles becomes troublesome during May and June, and also—as it has this time—in the winter months, November, December, and January.

So it has come again, has it? I knew it would, we country bumpkins say, in spite of all their sewers and drains, the blocking up of the good old well, the new water supply, and all the rest of their newfangled arrangements. I thought there was to be no more fever, no more nothing again. Not that it matters; it's only measles, only a children's complaint; they are bound to have it sooner or later, and maybe it's better first than last.

Truly, the prevalence of measles seems little affected by sanitary measures, thereby widely differing from some other of the contagious fevers. The adoption of a pure water supply, the provision of good sewage arrangements, and the improved construction of dwelling-houses (as regards their sanitary arrangements) have reduced the death-rate of typhoid fever by more than one-half, and sufficed to render outbreaks of cholera "practically harmless." Similarly, the construction of more spacious dwellings, with improved methods of ventilation, increased habits of cleanliness, and the arrangement of houses and blocks of buildings at such distances as will allow free circulation of air around and between them, have reduced the death-rate of typhus (peculiarly the disease of overcrowding and insufficient ventilation) to about one-ninth of what it formerly was.

Measles, however, breaks out widely and pretty regularly about every three or four

years, in spite of all our vaunted improvements in sanitation, and in this respect resembles whooping-cough. The spread of either of these diseases is difficult of prevention, since the little patients suffering from them are sources of infection before the characteristic rash (in measles) and whoop (in whooping-cough) become marked, so precautionary measures for preventing the spread of contagion are often delayed until too late, till the little patients have for days, or in the case of whooping-cough for a couple of weeks, been breathing and coughing, sneezing and spluttering contagion, all about them.

Measles attacks all susceptible persons exposed to its special contagion, and so rapidly spreads amongst young children; and as one attack usually protects against future seizures, the complaint is often regarded as a "children's disease." As a matter of fact, however, persons of any age, unprotected by a previous attack, readily take measles. We met with several grown-up persons who were attacked during the present epidemic, who had escaped the complaint during their childhood and youth; and we are constantly hearing of similar cases in other localities. When contagion was ship-borne to the Faroe Islands, the inhabitants were all of them smitten, not merely the children, but the old and young, the aged and the infirm, the weakly and the strong alike.

We know of one comely matron who never had measles before she was married, but since has suffered from it four times, catching it on each occasion from one of her own children. Hence there are exceptional instances in which one attack is not protective against another. "The exception proves the rule."

We country folk do not make any fuss about measles. We put the children to lie down on the old screen near the fire, give them marigold tea to bring out the rash, and linseed tea if the cough becomes troublesome. That rosy-cheeked lad and his chubby sister have already had it, and are already running about in the frosty air,

tumbling over the slides and gambolling in the snow, none the worse for their fortnight or so indoors. But, somehow, little Girlie, the youngest, does not get on. She is the weakly one of the flock, and has only just learned to toddle about, rather tipsily, on her own account. There's something wrong with Girlie, and very wrong, too, it seems, for she lies helplessly and heedlessly on her back, coughing huskily, breathing quickly and wheezily, not noticing her toys or playmates, of which yonder broken-haired terrier is the staunchest.

Yes, there is indeed something bad the matter with Girlie, and a gloom falls over the little household, a shadow of some approaching evil, a nameless dread, which causes the tired bread-winner, after his three-mile drudge homeward, to sally forth again supperless through the clogging snow and blinding sleet in search of his friend the doctor. In due course, it is found that poor little Girlie is suffering from severe bronchitis, and the following day, at the doctor's request, more assistance is sought for, and a good kind lady—one of the recently formed St. John Nursing Corps—calls to help in tending Girlie.

Now, we country folk of the working classes are an independent set; we earn our livelihood by hard manual work; and we remember—even in this our time of trouble—that "an Englishman's house is his castle." Wherefore we look suspiciously and with a stand-off sort of air on the entrance into our midst of a strange lady. Cannot we mind our own child? Are we not willing to stop away from work, even at the risk of being dismissed by our employer? Are we not ready to go without food, without rest, so that Girlie may have her medicine, her food, and her poultices all in their proper time? Our doctor is a "friend in need," and we know of old a "friend indeed." But why did he bring this stranger here? So we watch suspiciously and on our guard, and the broken-haired terrier executes a strategic movement to the rear, backing silently under the screen on which his sick playmate lies, his hair bristling, and his teeth

gleaming ominously, preparatory, if need be, to a vigorous flank attack in defence of his favourite. But this awkward state of armed neutrality soon subsides. The newcomer is one of Nature's ladies; she has an honest, kindly face, and a winsome manner. A few sympathetic words, a little quiet unobtrusive assistance to the tired mother in the matter of poultice-making and of warming food for the sick child, a little tact, a visible desire to help the tiny invalid, and there is a decided thaw in the family reserve. When Girlie, waking up for a moment or two, smiles at the pleasant, kindly face, the conquest is complete—emphasized by the whacking of the broken-haired terrier's tail against the bottom of the screen.

By degrees matters are quietly talked over, and it is arranged that the lady shall call daily and help to nurse Girlie. Other little things are settled with the agreement of the doctor. The upstairs room, the bedroom, has no fireplace in it, so it is agreed that Girlie must remain in the lower room both day and night, the fire constantly kept up, and an old stout counterpane hung so as to ward off draughts from the crevices about the ill-fitting door.

The lady, when she comes the following day in the fulfilment of her charitable mission, does not come empty-handed. She brings a thermometer, which she hangs upon the wall near to where Girlie is lying, so that the heat of the apartment may be ascertained more accurately and kept more equably, and she also brings suitable nourishment for the little invalid, as chicken tea, meat essence, barley water, a tin of Benger's Food, and other little articles of a suitable character. And so it comes to pass that in a fortnight, or thereabouts, matters have righted themselves; a little life has been saved; happiness and content once more reign in Girlie's family. The kind lady-member of the recently formed nursing corps has earned the lasting gratitude and affection of those whom she has helped in their time of distress; she herself experiences the satisfaction born of

really good and charitable work ; and last, not least, she has learnt to appreciate the sterling qualities of her poorer and less fortunate brethren, while the latter, in their turn, see that the sympathy and willingness to give aid on the part of their well-to-do neighbours is genuine, and dependent on true kindliness of spirit and goodness of heart.

Now, from all this we are led to a few general considerations as to the management of the sick—more especially, as in this case, sick children—in the houses of the poor. The points to which we are about to refer may seem—and we know do seem—to some as trivial matters, but we must insist on their extreme importance, more particularly when chest complaints are in question, and the stricken ones are young children. Our theme is “only measles,” but it is well to remember that half of all the deaths from measles occur in children under two years of age, and in the great majority of instances from chest complications, as bronchitis or inflammation of the lungs.

In the course of our daily wanderings we have seen much of the working classes, and of their home-life and habits. In connection with the particular industries with which we are most familiar, the dwellings of the working classes—though, of course, somewhat variable in size—are mainly characterised by two principal rooms, an upper one or bed-room, and a lower one on the ground floor, almost literally on the ground, which is the day-room. In many instances there are only these two rooms ; in other cases there are one or two other spaces, which by courtesy may be called rooms, though these are mostly used as receptacles of rubbish (as broken furniture, old clothes, etc.), or for the storage of coal, wood, potatoes, or other needful articles. Too frequently the slating is defective, the bricks are of poor make, there is no damp-proof course in the walls, the site of the house is not concreted, the rain-water pipes discharge their contents on to the soil outside the house without any guttering to

carry the water off. Such faulty construction leads to excessive dampness of the poorer class of dwellings, especially when, as is frequently the case, the site is insufficiently drained. The leaking roof not only admits rain, but allows the water to soak into the porous bricks of the wall, each brick being capable of holding something like sixteen ounces of water. The absence of a damp-proof course—usually a layer of slates placed in cement through the wall a little above the level of the soil—allows moisture to rise into the wall from the earth. The walls themselves are often so thin, and the bricks of which they are constructed so porous, that hard-driving rain readily permeates the substance of the wall. The site of the house is scarcely ever concreted, the tile, stone, or (less commonly) the wooden floor having only a layer of ashes intervening between it and the soil. Hence the air and moisture contained in the soil are readily drawn up by the warmth of the house. Damp exhales, therefore, from both the flooring and the walls, the wet condition of the basement, bad enough in insufficiently drained ground, being rendered still worse by the water from the rain-pipes being allowed to sink in at the sides of the house. Bronchitis, chronic and acute ; rheumatism, sciatica, and other neuralgic complaints, are, it has been often remarked, particularly rife in the district we have under consideration ; and doubtless the state of the dwellings inhabited by the working classes forms one important cause of such disorders. An instructive illustration of the effect of damp was afforded by a Government report on the towns of Old and New Swindon, which, though close together, and similar in many ways, differ in the fact that the excessive dampness of New Swindon was found to be accompanied by an increased death-rate from measles, whooping-cough, bronchitis, and inflammation of the lungs.

Another common defect in the dwellings of the poor is that, in the chief upper room—the

sleeping apartment--there is very frequently no fireplace, or, if there is one, it will not work; it does not draw properly, it smokes, or it is blocked up with rubbish. This, under ordinary circumstances, is a great evil, since a good fireplace and chimney form the best possible outlet for the close atmosphere of the bedroom. The air of the room, fouled by the breathing of the occupants, and heated by their bodies, increases in bulk, becomes lighter, and passes away up the chimney, its place being taken by fresh outside air, pressing into the room from without through the ill-fitting windows, and up the stairs from the crevices beneath the door and elsewhere—it is to be feared also by foul air rising up, for reasons before explained, from the basement. When a good fire is burning, an up-current is produced in the chimney, of strength sufficient to purify the air of an ordinary room with three or four people in it. But even when there is no fire there is still a less powerful current up the chimney, which may be readily increased by placing a lighted lamp in the fireplace.

Where there is no chimney, there is no proper outlet for the befculed air, polluted (as it must of necessity be) by the breath of the sleepers and the exhalations of their bodies. The occupants of the room do not certainly quite "stew in their own juice," but they are poisoned more or less by their own breath and emanations, which they breathe and rebreathe over and over again. What wonder, then, that the occupants awake drowsy and with headache, a feeling of nausea, and distaste for food!

In this wintry and bitterly cold season, it is a common practice to warm the sleeping apartment by placing a lighted lamp in it. (We are not now alluding to the putting of a lamp in a fireplace for the purpose of improving ventilation.) This, however, only makes matters worse, for the burning of the lamp still further pollutes the air of the room, robbing it of its goodness, its essence, its oxygen, and fouling it by adding the poison—carbonic acid. "One

good oil lamp," we are told, "or two sperm candles, render the air about as impure as one man does." The air of the room is doubtless warmed a little by such a plan, but not nearly to the extent that is imagined. This may easily be tested by means of a thermometer.

The fact is, that the closeness and stuffiness of a room is apt to be mistaken for warmth. This is very curious, but it is the fact nevertheless. And how easily the two conditions may be distinguished! The degree of heat may be ascertained easily and accurately by the *thermometer*, the purity of the air by the *sense of smell*.

A thermometer may be secured at a trifling cost, and it should be hung on the wall of the room, away from the fire (if there is one) and away from any draught, at about the level of the bed. When it registers 55° F. the room is at about the right temperature, except where there are children and aged people, when it should be higher—at least 63° F.

The purity of the air is quite another thing, and may be tested readily by a person's sense of smell. The individual must, however, come straight into the room from the outside atmosphere; if he does so, he ought not to fail in detecting any difference in point of freshness or disagreeable odour between the air of the room and the outside air. If on entering the room he detects an odour of closeness, stuffiness, or of an offensive character, then the air is impure. It is a singular and fortunate circumstance that the impurities thrown off in our breath and in the exhalations and discharges from our bodies are thus recognisable by the sense of smell. This sense, too, may, with frequent practice, be rendered extraordinarily acute, and an extremely sensitive test, if used in the manner described.

We have already insisted upon the necessity of a good and workable fireplace and chimney, not only for warming purposes, but as an outlet for the foul air of the room. It stands to reason that, if the air of the apartment passes

away up the chimney, other air must press in through every available crevice and opening to take its place; and in the small dwellings of the working classes it usually does so under the doors, producing a sharp draught that bites the little ones playing about the floor, with the result of much bronchitis and oftentimes pneumonia. The chinks of badly-made windows, the cracks and holes of broken panes, the splits and the crevices in old, shrunken, or badly-fitted doors, are all inlets for the outside air, and all, we need hardly say, are productive of draught. The window is the proper and natural inlet for fresh air; and to avoid draught from this source, it is a good plan to raise the lower sash a little, fitting a piece of board, or stuffing in folded carpet, or sacks, beneath it, so that no air can rush in at the bottom of the window. By this arrangement the fresh air enters the room in an upward vertical direction between the two sashes, and is less liable to produce draught, and this plan is often the most suitable, indeed the only one practicable, so frequently do we find the upper sash fixed and immovable. Otherwise, the top sash can be lowered slightly instead, when air passes into the room between the two sashes in a vertical direction, and above the top sash in a more or less horizontal current. Draughts may be warded off by proper arrangement of the blind, or a screen, or by placing a board near the opening of the window so as to direct the draught upwards towards the ceiling. It is always best to utilise the window as an inlet for the fresh air, since otherwise the latter rushes in through every available crevice in window, wall, door, or floor, giving rise to innumerable and hurtful draughts. Under such circumstances, if the openings are insufficient for the admittance of air, the outside air forces its way *down* the chimney in gusts to fill the void left by the escape of the foul air *up* the chimney, and so the chimney smokes.

We are strongly of opinion that our friends among the working population might be use-

fully instructed in such simple arrangements as those described, with the result of increased home comfort, greater freedom from ordinary colds, and the more severe attacks of bronchitis and pneumonia, especially among children and aged people. We think that district visitors, members of the St. John Nursing Guilds, and others, who through kindness of spirit and charitable motives, are brought into closer touch with the working classes—we think that such as these might take an opportunity now and again of saying a word in season, of explaining to the wives and mothers of our workmen's homes the simplest plan of securing purity of air without exposure to chill, of testing the heat of the rooms, of distinguishing clearly between the warmth and the stuffiness and impurity of the air in the house, of the uses and methods of ventilation and warming.

These matters, apparently trivial perhaps to those in rude health, assume peculiar importance in times of sickness, such as the present, when crowds of little ones and aged persons are lying dangerously ill. An old-fashioned Christmastide is a joyous season to many. It brings snow for irrepressible school-boys to pelt each other with, ice for our youth to skate upon, bright holly-berries and mistletoe, Christmas-trees, plum-pudding and snap-dragon, dances, pantomimes, and festivities of many kinds. Yes, to the robust and the strong, it is healthful, refreshing, and invigorating. But to the very young and the aged, the weakly and the infirm, the poor, needy, and ill-clothed, it is both lowering and dangerous. The feeble vital powers of such as these cannot withstand the bitter cold. The cutting east wind and the biting frost smite the very young and the aged alike, the tenderest and most beloved flower of the flock as well as the honoured patriarch, even as the blast of the destroying angel. Many hale old people, many joyous little ones, have been swept pitilessly away, during this old-fashioned Christmastime, by bronchitis and pneumonia—diseases

notoriously dangerous to the young and the aged. And now that measles is so prevalent, the fact that half the fatal cases from this disease occur in children under two years of age, the majority of such deaths being the result of bronchitis or other lung complications, affords much ground for reflection.

The usual custom, we find, among the working classes, during the outbreak of measles, is to place their little ones, dressed, to lie down on the "screen," a kind of long seat with a high back reaching to the floor, near the fire. The "screen," if of good size, and if properly placed, is very convenient for children to lie on foot to foot, the back of the "screen" serving to ward off any draughts. Careful parents usually continue during the daytime to make their little invalids cosy and comfortable enough; and as the fire is kept up well, and there is no lack of space for fresh air to flow in through the crevices around the door (especially below it) and elsewhere, at the same time that the draughts are warded off by the back of the "screen," or by a well-placed and properly slung counterpane, the air which the tiny sufferers breathe is of sufficient warmth and purity. Danger, however, comes with night. The parents, careful and anxious though they may be, carry their little ones upstairs to bed, out of the warm day-room, straight away into a cool and, in many cases, impure atmosphere for the night. In a general way, from one cause or another, there is no fire in the bedroom. There is no fireplace at all, or it is useless, because either blocked up or of faulty construction. So in this bitter winter season, the little invalids—with a tendency to bronchitis and other lung diseases always born of measles—are taken from their cosy, warm berth on the "screen" downstairs into a chilly, well-like apartment upstairs—a highly dangerous custom, even as regards healthy children, who are always extremely sensitive to cold. To make matters worse, the air of the room, after the family have slept in it for some hours, becomes un-

wholesome and stuffy, impure and close, and this musty state of the air frequently gives rise to a mistaken impression of warmth—the real fact being that the air of the room is both impure and very cold, the worst, the *very* worst, possible condition for young children, more particularly if ailing from measles, or any chest complaint.

The outside temperature is usually at its lowest point at 3 a.m., and about this time, too, the vital powers seem often at a low ebb; and when it is considered that the bedroom is next the roof, the outside temperature very many degrees below freezing point, and that the fire in the room below has burned out, it becomes at once apparent to what a dangerously cold temperature the poor little mites suffering from measles are exposed. Add to this, perhaps, a rather poor oil-lamp burning in the room, and the presence of the parents and several children, and the impurity of the atmosphere becomes equally a matter of certainty. What wonder is it that so many little children who have only measles are smitten so severely—often, alas, so fatally—with bronchitis or inflammation of the lungs! Thus it was that Girlie suffered, and had it not been for the suggestion of the doctor and the kind lady, that the little invalid should be kept altogether in the downstairs room, night and day, with a good fire, another family would have been plunged in grief. Moreover, it is so easy to make a snug little bed for children on a good old-fashioned "screen;" and the little mites, when undressed and put into their extemporised "screen"-bed, get so pleasantly warm and cosy. The temperature may be kept fairly equable and at a proper degree of warmth by ordinary attention to the fire, both by night and day. This is rendered much more easy by the use of a thermometer, which should be hung on the wall near where the little invalid lies—neither close to the fire nor in a draught. Young children even at their best need considerable warmth, and this is still more the case in time of illness,

and especially when the air passages and lungs are involved. The temperature proper for a nursery is laid down at 63 degrees F.; and this degree of heat is requisite for a room in which children suffering from measles are lying. The great point is to keep the warmth of the room as equable as possible during both the day and night. Care must be taken to prevent draughts falling on the little patients, and this can be usually managed by judicious placing of the "screen," and arrangement of a blanket, counterpane, or blind to intercept or ward off any undue currents of air. A healthy and robust person may scarcely perceive a draught which is distressingly perceptible to a sick child, so it is well to test different parts of the room with a lighted candle, the flame of which will quickly indicate the direction of any considerable air current. If there be serious chest complication, not unfrequent in measles, the doctor may likely enough direct that the air should be kept moist as well as warm. Frequently a proper bronchitis kettle is not available for this purpose, but an efficient substitute can easily be made by fitting some tubing on the spout of a common kettle, so that the steam may be carried well into the room. The better plan is to arrange a little tent in such cases over the child's bed, of a blanket, shawl, or curtain, and to so arrange the kettle and its prolonged spout as to send the steam into it. "An extemporary cradle," writes Mrs. Dacre Craven, "for a sick child can be made out of a clothes-basket or a large drawer, and an extemporary bedstead by arranging chairs back and front, alternately, tied together by the legs. The chair-backs at the top should be arranged so as to admit of stout string or a walking stick being tied firmly across them, over which the blanket can be thrown"—that is, if an improvised tent is needed.

Once the room has been satisfactorily arranged, it is comparatively easy to keep the air of sufficient purity and warmth both day and night. If steaming is ordered, as above de-

scribed, the process not only moistens the air but contributes much to increased warmth.

Attention to these and similar arrangements, though seemingly trivial to many, is of the most vital importance, as we frequently, almost daily, see, when the care of sick children is in question.

We have over and over again witnessed the devoted and intelligent efforts of women of the working classes (ably seconded by their husbands) on behalf of their suffering children, even in cases manifestly desperate, crowned by the happiest results. We have seen over and over again little children suffering from measles, in great peril from chest complications, usually severe bronchitis, successfully brought through their trouble by the common sense displayed by their parents in nursing them day after day, night after night, in the same room, usually on the ground floor, the fire being kept continuously in, and the utmost care taken to avert draughts. This is one side, the bright side, of the lesson taught us in our wanderings amongst the houses of the workpeople during this outbreak of measles. The other side of the picture—the other aspect of the lesson—is a sad one. We have seen, not once, nor twice, but many times, the fatal error committed of taking the sick children from the warm comfortable room in which they were tended during the day upstairs into a cold and often a damp room for the night—with the result that serious chest complication—bronchitis or inflammation of the lungs—supervened. In too many of these instances proffers of assistance, kindly advice, professional and other help came too late.

Yet a word in season, a little quiet explanation of what is best, or rather what is "common sense" to do in time of sickness, would, in all likelihood, often have averted a catastrophe. It seems passing strange that of all the sick-visitors, district visitors, ministers of religion, and others interested in the welfare of the poor, that of all the "friends of the working-man," there was not found one thoughtful enough,

kind enough, wise enough, charitable enough, to throw out a few practical suggestions, if only out of pity, for those stricken little ones. Puling sentiment, obnoxious commiseration, ignorant condescension, are quickly seen through and resented by the industrial community. True-hearted and practical sympathy is speedily discerned, and is worth many sermons.

In many a humble home, during this present epidemic, no warning note was uttered—when danger clearly threatened—by all the swarm of “friends;” and so,—a tiny empty chair; a piteous last farewell; another small mound in God’s acre.—*Only MEASLES!*

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#### KOCH’S TREATMENT OF TUBERCULOSIS.—A WORD OF WARNING.

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By ARTHUR J. MOSS, M.B., Ch.B., M.R.C.S.  
 PROBABLY never since the first century of the Christian era has the world witnessed such a pilgrimage of the sick seeking help from a miracle worker as has occurred during the latter weeks of the year 1890. After the first details of his discovery were first given by Koch to the world in a most modest, deliberate, and cautious manner, a wave of excitement and enthusiasm seemed to spread in ever-widening circles over the whole world. The still, small voice of Koch himself was taken up by the lay press, and echoed and re-echoed until it sounded like a trumpet-blast, calling upon everyone whom it concerned to lay aside all else and rush to Berlin. Wonderful reactions, marvellous effects, and cures miraculous were all set forth day by day to increase the excitement already created. Doctors left their practices in all parts of the world, with a view of learning the details of treatment by the new panacea for human woe. Invalids in hundreds deserted comfortable homes and careful attendance, caring nothing for December gales, snow, or ice, actuated only

by one aim, viz., to get to Berlin, and ensure a short cut to health by means of Koch’s new treatment. They neither knew nor cared what sort of hygienic surroundings they would have to meet with both on the journey and in Berlin itself: one sole desire possessed them—to reap their share of the benefit of the new discovery at any cost.

The easiest and quickest route to Berlin is undoubtedly via Queenborough and Flushing; but in wintry weather by this route the ordinary dangers to the invalid incidental to travel are increased. The drawbacks really commence at Flushing, and although a great deal has been done for the comfort of passengers, still much remains to be desired. The carriages are heated by steam, and although by means of a lever in each compartment the temperature is supposed to be under control, practically this seems occasionally to fail to do its work. As an instance, on my outward journey, in spite of all our efforts, the temperature of the air, as measured by my clinical thermometer, rose to 104° F.; it was snowing heavily outside, but, nevertheless, the windows had to be thrown wide open to get the compartment to a bearable temperature. On the return journey the reverse happened; it was equally impossible to keep warm. In Berlin the cold out of doors was intense, while indoors the rooms were kept in that stifling condition of heat and dryness of air so dear to the German heart. In the newest and most modern hotel the bedrooms have double windows and double doors to keep out the cold—instead of an open fireplace a great closed tile stove; in fact, every convenience that malicious ingenuity could devise for preventing any possible entrance of fresh air or exit of foul. In most of the hospitals, with one or two brilliant exceptions, things were very little better, so that a consumptive patient going to Berlin at that time placed himself under conditions decidedly not favourable to the success of any kind of treatment.

After all these drawbacks and inconveniences they had still to discover that the "precious fluid" of the press and of their dreams was by no means so universally beneficial and innocuous as they had imagined. Doctors who stayed and examined into cases carefully began to discover very serious consequences occasionally occurring after injection. Temperatures ran up to heights almost unknown (even to 108° F.), extreme collapse was not at all an uncommon sequel, intense jaundice sometimes occurred, and even death, as a consequence of the effects produced by the injection. In fact there was no organ in the whole body which might not be affected seriously by this substance. Even at the present time it is impossible for the wisest heads to predict what may be the effect of any given dose; in one case perhaps it may cause death, and in another, apparently precisely similar, no reaction whatever may occur. Add to all this the evidence recently given by that eminent pathologist, Prof. Virchow, who, summarizing the results of post-mortem examinations of twenty-one fatal cases, is of opinion that this substance may and does set up tubercular disease where none previously existed, and a fair idea of the risks a patient runs may be properly appreciated.

So far we have dealt with the adverse side of the case only; let us now consider what can at present be safely said in its favour. First with regard to lupus, for in this external disease we can readily watch and appreciate the effects of the treatment. That the lymph possesses a wonderful power of acting upon lupoid tissue none can in the least dispute. Case after case has been treated, and, most of them, with striking success. Rapid cures of the most convincing character were at first boldly recorded, but, unfortunately, the disease has in many of them again recurred with great rapidity. Whether further treatment in the same way may lead to a final and radical cure of the disease remains yet to be seen. In view of the rapid manner in which patients become

tolerant of the lymph, it seems quite possible that further repetition of the treatment may cease to have any effect. In some cases of tubercular diseased bones certainly very wonderful cures have occurred, in course of time the sinuses leading to them having apparently completely and soundly healed, and it seems probable that in precisely these cases, where the new treatment can be used along with surgery, the best results of all will be obtained. In diseases of the joints, and also in strumous glands, it is doubtful whether much good has as yet resulted. Some observers have failed to find any benefit whatever by the treatment. Every case of tubercular meningitis treated so far has had a fatal issue, and it is now regarded as one of the conditions which must not be submitted to injection.

We now come to the most important disease of all, viz., Phthisis, for it is in consumption proper that the great interest of the lay public has centred. Before attempting to judge of the results obtained here, a broad distinction must be made between *subjective symptoms*, which mean what the patient himself feels and says, and *objective symptoms*, such as gain or loss of weight, changes in the physical state of the lungs, &c., which the medical man can make out and appreciate for himself. Now, in phthisis, subjective symptoms alone merit only minor importance, for it is well known that every change of treatment brings about in hopeful patients a declaration that they feel better at first, and in fact they really do usually improve for a time under every change. The same thing happened over and over again under Koch's treatment; led on by hope eternal, patients have imagined and felt improvement. When we come to objective symptoms, however, it is by no means so easy to demonstrate the improvement. If we take, for instance, the question of bodily weight, we find the most diverse variations. A minority have gained in weight, while the great majority have remained stationary or lost. When we come more nar-

rowly to compare the social status of the cases that have gained with those that have lost we find, with but few exceptions, that the former class is recruited from the poorer classes, who have had to battle with bad and insufficient food, bad sanitation, and poverty. Take these people into hospital, give them proper food, and the gain in weight will take place without any injections. It was mainly the well-to-do cases, who had had all the advantages that money could purchase, who lost most in weight. With regard to the changes in the physical condition of the lungs, in nearly every case these point to an advance of the disease, in that a much larger proportion of lung substance shows signs of disease after the injection than before. All the physical signs, in fact, increase; and, up to the present, many most careful observers have failed to find any retrocession of them yet. Hence it is evident that a large number of cases are objectively much worse than before, but at present it is too soon to say that they may not eventually entirely recover. A long period must necessarily elapse before anything like a satisfactory decision can be given with regard to the final effect of the lymph in phthisis. Meanwhile, any rash statement must be carefully avoided.

The injection of the lymph has been strongly recommended as a means of diagnosis in cases of doubtful tubercular disease, and, while recognising the scientific accuracy undoubtedly thereby attained, I would seriously question the prudence of such a proceeding, in view of the unexpected and unavoidable disastrous results which may occur.

Undue terror of consumption seems to have such a deep root in the public mind that people utterly ignore the fact that there are here in England hundreds of people living and working in full health and vigour who have undoubtedly had phthisis and recovered completely. By proper and judicious treatment, by attention to all details of food, clothing, and sanitation, perhaps associated with a sea-

voyage or other forms of climatic change, many a consumptive has been cured of his phthisis and restored to a life worth living. Are we justified, then, at present, in discarding well-proven means in favour of—an uncertainty? Certainly, hygienic treatment has never had to answer for the terrible disasters which have occurred since the use of the new remedy. Our attitude towards the new treatment should be that of benevolent anticipation, recognising fully and admiringly the brilliancy of the scientific discovery, and hoping that in the future it may lead to a reliable method for the cure of a decimating disease.

### THE BRIGHTON WATER SUPPLY.\*

By Alderman W. H. HALLETT, F.L.S., J.P.,  
D.L., formerly Chairman, Waterworks  
Committee, Brighton Town Council.

THE water supply of Brighton is not, as with many towns, obtained from rivers or lakes, nor, as with some others, from the rainfall on moorland collected into a great storage. Here Nature provides subterranean reservoirs of limpid water, from which the action of light is excluded. From a depth of 150 feet below the surface the water is pumped into elevated reservoirs varying in height for the purposes of convenient distribution. These reservoirs are so constructed as to be closed against the action of light and of atmospheric influences, and contain large bulks of one million gallons and upwards, and the water in them is constantly changing. What is supplied from them by the "Constant" service is as it was first met with below ground.

\* At a time when Londoners are taking steps to rid themselves of the monopoly of the great Water Companies, and to get into their own hands the control of this important supply, these particulars of the manner in which Brighton obtained and carried out the management of her own water supply is of general interest. The paper from which they are extracted was read by Alderman Hallett, before the Sanitary Congress, 1890.

From a sanitary point of view this "Constant" service of Brighton excels all water supplies not so secluded from the action of light and of air; not even excepting the famed Loch Katrine water supplied to Glasgow, or the water of the Vyrnwy supplied to Liverpool.

On the South Downs, which environ Brighton for an area of 60 or 70 square miles, let it rain ever so hard, the surface is soon dry, and, beyond a few ponds, no lakes or rivulets are seen. The sub-soil is in general that of the upper chalk formation with flints. This acts like a sponge in retaining the rainfall passing to it from the surface. Upon saturation, the overflow finds its vent mainly by underground courses. The two rivers, the Adur, five miles west, and the Ouse, eight miles east, which flow through the hills, serve as the drainage of the Weald, not of the Downs.

Explorers in the chalk find fissures through which pass rivulets and rills seawards, and below low water mark on the seacoast freshwater springs work their way out.

Formerly wells were sunk in the chalk formation with an uncertainty as to result, very like that which is still experienced by those who dig in Sand Rock.

In 1830 an effort was made by a company to secure a systematic supply to the town of Brighton, and their first well was sunk in the Lewes Road. The water was raised by steam power to a reservoir 220 feet high. The supply being easily pumped out, to increase it tunnels were driven in the form of a cross, also to serve as a storage to pump against. A boring was also tried to a greater depth, but without beneficial result.

In 1852, consequent on great complaints of the inadequate water supply, a new company replaced the first, with powers to carry out extensive works, and also undertaking to give a "constant" service supply.

This duty of giving a "constant" supply the company afterwards desired to be relieved of, but were unsuccessful. They found that al-

though only 7,000 services were connected with their system (hardly half of the then existing houses) their supply was quite inadequate. They sank a well at Preston, on the east side of Miller's Hill, hoping thereby to catch water coming from the upper part of the valley of Patcham, but without good result. The Patcham water was found to draw to the east, and the tunnels at Lewes Road being extended to their western limit intercepted some of this supply of the Patcham springs.

The directors then called in Mr. James Easton, who had successfully secured water for the supply of Ramsgate, built on the chalk formation of the Isle of Thanet.

Mr. James Easton's method of cutting across the fissures is that which is acted on in all the water stations of the Corporation.

He had ascertained and proved that where the stratification of the chalk has not been disturbed by upheavals or depressions, the fissures, which are the water conduits, are found to be at right angle (or thereabouts) with the coast line.

Each fissure contains a small rivulet, beginning at the supersaturation of the chalk, and flowing on and collecting more water as it proceeds.

The sides of the fissures are coloured by infiltrations of particles of the upper clays.

The fissures are seldom more than a few inches wide, generally not one inch. Hence there is considerable resistance to the passage of the water. At a distance from the outlet, the water stands higher and higher in the wells as the distance increases, as was shown by Mr. Edward Easton, C.E., in his paper on these waterworks read at the Brighton Health Congress in 1881.

In an earlier paper, read in August, 1872, at the meeting of the British Association in Brighton, Mr. Easton stated that the maximum of water in the chalk is generally in the month of March, and the minimum in the months of October, November, and December. From plans

of curves then shown by him of the varying depths in the wells, the supply appeared to reach them in three and a half to four months after rainfall. He concluded that the chalk acts as a storage-reservoir in retaining the usually heavy rainfalls of the months of October, November, December, and January, during which time evaporation is least in operation.

Up to 1865 the whole supply of the company was drawn from the Lewes Road Works, when the directors began to prepare for a new and independent supply to meet a growing and an expected increasing demand. They then commenced at Goldstone Bottom, on the west side of Brighton.

In his paper read before the British Association, Mr. Easton stated that there were two distinct sources of supply, each sufficient to give a maximum supply; that there were three sets of engines, each equal to the delivery in 24 hours of the then maximum demand; and that there was storage capacity in the reservoirs equal to two days' supply. There were then 18,000 services connected, of which 5,000 were on the "constant" service. The tunnels in Lewes Road were 2,400 feet in length, and those at Goldstone were 1,300 feet in length. The town was divided into four zones, served from "Low," "Middle," "High," and "Higher" Reservoirs.

This answers as a stock-taking account of what the Corporation obtained for their purchase on acquiring the control, 1st July, 1872.

Prior to 1872 there had been for some years a general feeling of dissatisfaction that the "constant" supply progressed but poorly, and that fire mains were feebly served. The Works Committee had also been in contest with the company for several years as to a vexatious mode of charging for street watering and for sanitary purposes. The Corporation were often taunted with want of enterprise and want of public spirit in not taking the waterworks.

It may be of permanent interest to show

what difficulties stood in the way of public authorities doing this twenty years ago.

The position of a company was nearly impregnable in those days, when Parliament discountenanced every interference with vested interests.

Mere dissatisfaction of the consumers, and even considerable mismanagement, did not afford sufficient ground. Even on vital questions which affect every individual in a community, the "quality" and "quantity" of water supplied, Acts of Parliament and Law Courts only recognised one ground for withdrawing the control from a private company formed for a commercial speculation—viz., a "breakdown in supply."

What was actually carried through by the Corporation is the first instance of compulsory termination of a water company's career. It was thought by the Birmingham Corporation important that I should give evidence when they were before Parliament in June, 1875, to get the control of the water supply of their district. I was able to show the very prompt action taken by the public authority, at an expenditure of £30,000, in carrying out every contemplated work which had been pondered over so slowly by the directors of the company. The Birmingham evidence showed extraordinary negligence in filtration, so that animals like tadpoles and such-like forms passed out of the public drinking taps. The charge of the water supply of that whole district was given over to the Corporation of Birmingham.

In order to move at all, it was essential to put on record a substantial breakdown, which occurred on the 24th October, 1871; and at a meeting of the Town Council held on the following day, upon my moving a resolution to that effect, it was unanimously voted to take steps to acquire the waterworks. There was just time for giving Parliamentary notices.

When the bill was deposited, the company's solicitor represented that the directors would

fight the "compulsory" clause, but would concur in a clause for purchasing by agreement. A sub-committee to negotiate was appointed, consisting of the chairman, Mr. D. Friend, Alderman Abbey, and myself. The terms arrived at were quite as moderate as would then have been imposed by a Parliamentary Committee, and were satisfactory to all concerned in the sale. A sudden scarcity in coal supply made the directors anxious to be rid of responsibility, and they offered to make an earlier transfer on June 30th, 1872.

The Waterworks Committee was appointed in July, 1872, and chose Alderman Ireland chairman. I was already fully occupied with the British Association meeting as treasurer and chairman of executive. In November Alderman Ireland became mayor, and I was appointed chairman for two years. For the first year and a half the committee had arduous work during the coal famine in watching the supply. With prices at 35s. per ton, instead of 20s., there was great fear of a deficiency. The instant that had passed off the committee took up to the Council in one report all that had been under consideration by the directors of the company. In June, 1874, an outlay of £30,500 was voted at once, involving a new charge on income of £1,600 a year. This provided a duplicate engine at Goldstone costing £16,000, a new middle reservoir for the west, new mains, and also a liberal sum for driving tunnels. The droughts of 1873 and 1874 made this feasible, and by November 1st, 1874, great extensions had been made. On that day an exceptionally large fissure was opened at the foot of the entrance well, driving the men up it hastily, and no further work was admissible for several years.

With the best will to do everything necessary or desirable, the Corporation would not have succeeded as they have done in 18 years but for good and energetic advisers. From Mr. Edward Easton, C.E. (son of Mr. James Easton, already named) they have had such plans submitted

from time to time as have served to keep every part of the great undertaking well up to the mark. By their local engineer, Mr. John Baker, works of very arduous character have been carefully executed, and he has now the entire responsibility for carrying out the new pumping-station at Patcham.

Mr. John Baker was originally sent, in 1865, from Messrs. Eastons to superintend the erection of the first 150 h.-p. engine at Goldstone Bottom, and to begin the tunnels there. When the engine was completed, he was engaged by the directors of the company, as local engineer at Goldstone Works, and when the transfer to the Corporation was effected in 1872, he was retained in that capacity. Besides being a practical engineer of much skill, he has now greater knowledge of tunnels in chalk (both of the hard and friable kinds) than probably any man this kingdom possesses. Several times his life has been in jeopardy in the excavation works, which have all been carried out, ever since 1865, under his immediate direction.

The method hitherto pursued has been to sink the tunnels as nearly as can be to sea-level. It has been long known, however, that the chalk fissures go much lower, as some had been plumbed 150 feet without finding bottom. Mr. Baker, after very extensive workings, is of opinion that, if an opportunity offered, there might be intercepted below that level great supplies which are now escaping seaward. That subterranean conduits are at work at lower depths, and most probably finding an outlet under the sea, seems to be shown by the Warren School well, which was dug to a depth of 1,285 feet before meeting with water—or 700 feet below sea-level. When water was found it rose to about 100 feet above sea-level; pumping for seven hours at the rate of 8,000 gallons per hour lowered it 13 feet. Apparently, the source of supply was not strong. The water was not from the chalk, but from the lower green sand. The nearest green sand formation is a narrow belt on the north side of the

South Downs. If that was not the source of the Warren well the next possible source would be the Reigate Sands.

I have referred to Mr. Easton's stock-taking in 1872 and to the £30,500 passed by the Council in 1874 to carry out all that the directors of the company had had under consideration. The Corporation paid £350,000 for what they bought, and their capital debt is now £500,000. One hundred and fifty thousand added in 18 years (inclusive of the £30,500 just named), and what is there to show for the new outlay? The first step was to devote grounds at Lewes Road Station and build greenhouses at a cost of £1,000 for the head-gardener, who supplies therefrom all the plants required by the Recreation Ground Committee. High, middle, and low reservoirs now exist on each side of the town, intended to balance each other, so that water pumped at one side can transfer to the other, and great mains have been re-arranged and relaid for that purpose. The fire-mains have been materially improved in their force everywhere. The "constant" service main is everywhere. The Corporation have striven energetically to induce its use, and at the end of 1889 there were 18,812 constant against 6,893 which are still intermittent, or 73 per cent. of "constant" service connections.

In 1872 there were less than 28 per cent. connected. It is hoped that the remainder will come in more rapidly under the pressure of good example, but the cost deters of changing the pipes in a house to be adequate for the greater pressure from the public reservoirs. The capital has increased by 33 per cent., and the revenue from £24,000 to £42,000, or 75 per cent. There is a gradually increasing margin of profit notwithstanding so much more is supplied by the constant service, and although the Corporation supply water for street flushings both in Brighton and Hove (which may be counted in millions of gallons in the year) without any charge whatever; while

the company never supplied water for public uses without charges.

There must also be included in the £150,000 the purchase of the West Brighton Waterworks (£15,000), and the preparations for a station at Patcham (£10,000).

Nothing can better demonstrate the superiority of the present mode of seeking for water in the chalk than comparison with what the directors of the company did before the system was known. They actually dug in the Patcham Valley for water and relinquished their attempt, while the Corporation from 1883, and without fear of any failure, deliberately went to the same Patcham Valley for their third supply. To the works at Goldstone this better state of knowledge is owing, and to Mr. Baker's keen appreciation of the state of water affairs near Patcham tunnel may be attributed Mr. Easton's report in favour of a new station there.

A visit on the 6th of December, 1884 (after the Healtheries Exhibition), of engineers representing great London water companies was made to the Goldstone tunnels. Sir Francis Bolton and his colleagues of the East London Company left them, intending to adopt a similar system.

The sixth and final report of the Royal Commission on Rivers Pollution is devoted to the subject of domestic water supply of Great Britain. They report:—"The unpolluted deep well-waters from chalk rank amongst the best and most wholesome with which we have become acquainted. They are almost invariably colourless, palatable, and brilliantly clear. The chalk constitutes magnificent underground reservoirs, in which vast volumes of water are not only rendered and kept pure, but stored and preserved at a uniform temperature of about 50° F., so as to be cool and refreshing in summer, and far removed from the freezing-point in winter.

"It would probably be impossible to devise, even regardless of expense, any artificial arrangement for the storage of water that

could secure more favourable conditions than those naturally and gratuitously afforded by the chalk; and there is reason to believe that the more this stratum is drawn upon for its abundant and excellent water the better will its qualities as a storage medium become. Every million gallons of water abstracted from the chalk carries with it in solution on an average  $1\frac{1}{4}$  ton of the chalk through which it has percolated, and thus makes room for an additional volume of about 110 gallons of water. The porosity or sponginess of the chalk must therefore go on augmenting, and the yield from wells judiciously sunk ought, within certain limits, to increase with their age. The only drawback to these waters is their hardness, but this disadvantage is greatly reduced by the circumstance that it is chiefly of the 'temporary' kind, and can be easily removed by Clark's process."

The removal of the hardness can be accomplished for domestic use very easily and cheaply, which I described in a paper read at the Brighton Health Congress, 1881. This method is continued up to present date.

With respect to a general softening of water from the chalk, which has been urged by some patentees, the opinions of members of the Medical Association who met at Goldstone three years ago were strongly adverse. It may be softened when desired for domestic drinking and for culinary purposes; the water as it is was in their opinion much safer than is soft water passing through leaden pipes or retained in lead cisterns.

The continuity of policy, notwithstanding the many changes which have occurred in the Town Council, finds its deep seat in the views of the inhabitants at large of the importance of the question of a well-administered water supply. However diverse have been the reasons for which members have been sent to the Town Council, there never has been an occasion in the eighteen years on which opposition has been raised to new outlay for water.

No question of saving in a rate by an increase of water-profit through delay in outlay has even been hinted at.

The water supply is such as everyone desires to be the very best possible.

The policy, shortly stated, is to maintain and improve the efficiency of plant and mains, to supply outlying districts as readily and even more readily than a private company would do, to urge the substitution of constant for intermittent services, to give fire-mains good pressure, and to supply water freely for the effective flushing of all drains without charge. In such ways, although the money-profit paid at the end of a year is less, the benefit to the inhabitants through improved sanitary condition is felt to be by far more advantageous to the well-being and reputation of this great health resort.

#### PATENT MEDICINES.—No. III.\*

CLARKE'S BLOOD MIXTURE—MATTEI'S ELECTRIC REMEDIES—COLLIS BROWNE'S CHLORODYNE.

AMONGST the correspondence which these articles have elicited we have received the following letter from a gentleman at Shrewsbury:—"I should like to ask you a question about quack medicines, which perhaps you will kindly answer in the February number of HYGIENE. Of course, I do not dispute what Dr. Taylor has said as to the probable effects of taking Clarke's Blood Mixture; but what do you say to the case—which I cannot now find—mentioned in Clarke's advertisements, of a pauper who cured several holes in his legs by taking two or three bottles of the blood mixture? Did it never happen, or, if it did, how was it that the doctors could not cure him?"

Like our correspondent, we cannot find any particulars of the case upon which, judging by the straight questions put by him, he thinks

\* Nos. I. and II. of this series appeared in our December and January issues.

that the reputation of this "world-famed" specific for all the ills that trouble humanity must stand or fall. Advertisements occasionally furnish much amusing reading, but we must confess that when we come to a quack advertisement we commonly pass it by. It may be that we get tired of the monotony of successes all along the line, or that we are too matter-of-fact in our views to believe in modern miracles; consequently, we have not made the acquaintance even in print of the pauper referred to. Our correspondent will therefore, we trust, see our inability to discuss upon its merits a case of which we possess no knowledge whatever. Besides, our correspondent is somewhat wide of the mark. Our object in writing this series of articles is to urge the necessity of some modification of the present system of issuing Government stamps for quack preparations, seeing that a very large proportion of the community entertains the mistaken notion that the words, "Protected by Government Stamp," convey some sort of guarantee as to the nature of the ingredients. Unfortunately, the reverse of this is the fact; and hundreds of thousands of gallons of quack medicines, containing drugs potent for harm, are, under the ægis of the Government stamp, distributed throughout the length and breadth of the land. Further, we showed in our January article that the basis of Clarke's Blood Mixture is iodide of potassium, a drug of such powerful action that, in many persons, although administered in very moderate doses, it produces most distressing symptoms; while it should never be given for any length of time except under proper medical advice and supervision. When this general statement has been refuted, we shall be quite ready to deal with individual cases alleged to have been cured. If the iodide of potassium were as innocuous in its nature as the burnt sugar with which the Blood Mixture is flavoured and coloured, there would be admittedly less reason for these strong remarks made by Professor A. Swain Taylor,

F.R.S.: "The sale of medicines of this kind should be strictly prohibited, unless the bottles containing them were issued with a caution-label setting forth their true composition. It is only reasonable that a person should know what he is purchasing." Foreign countries have recognised this necessity; and so recently as January 1st of this year, a law came into force in Italy, prohibiting the sale of any remedy the composition of which is not officially stated.

This circumstance is mentioned by Mr. W. T. Stead, in the *Review of Reviews* for January, but instead of welcoming such a beneficial act of legislation, he only denounces "the unhappy prejudice which leads mankind to offer the most stubborn opposition to those who seek to do it good." He makes this observation on behalf of Count Mattei, whose electric remedies he champions. Our impression is that the Italians, similarly to other people, have long suffered at the hands of nostrum-vendors, and, presuming that our impression is correct, we fail to see how Mr. Stead can have arrived at the prompt conclusion that the Count was the special object of a long-needed protective measure. Certainly, if the Count's position be anything like so bad as Mr. Stead depicts, it must have been a most uncomfortable one. Mr. Stead says that the Count has for many years been in such dread of assassination, owing to the marked virulence of the attacks made upon him by the orthodox Faculty (what body of men would the unorthodox Faculty consist of, we wonder), that he has found it expedient to construct on the summit of a hill, forming part of the Bolognese Apennines, "a veritable fortress, in the heart of which he stored such apparatus as is necessary for compounding his remedies. There he has lived for years, and there he is living to this day"—we suppose, despite modern artillery and other siege weapons. "In a donjon keep, approached by a steel drawbridge at the top of a lofty tower; with a trusty

Andrea Ferrara by his bedside, and a tiny toy revolver"—a little antithesis here, we fancy—"ready to hand, the Count remains on guard against the assassination which he believes was once at least seriously planned by his enemies." We breathed more freely when we came to the end of this paragraph. The Count's life is no longer in danger through the wicked machinations of his jealous medical compatriots, and the fierce vendetta is at an end, so that, beyond the inconvenience attending his retirement to rest in the donjon keep, by the way of a drawbridge, only reached by wearily ascending a lofty tower, the Count can now sleep the sleep of the just, with no further need of his tiny toy revolver or his trusty Ferrara blade, both uncomfortable pieces of furniture in a bedroom, particularly in that of an old gentleman who has seen eighty-one summers.

But, apart from this extraordinary constant dread of assassination, why should not the Count have quiet nights? His electric remedies have this grand superiority over most other quack medicines—that they are absolutely harmless, judging by the subjoined report made by the well-known chemical authority, Mr. A. W. Stokes. It appeared in our December issue, but is so thoroughly worthy of study that we reprint it here, partly for the information of, and partly out of gratitude to, those readers of the *Review of Reviews* who have thoughtfully forwarded copies of the number of that periodical containing Mr. Stead's article, entitled "Can Cancer be Cured? A Visit to Count Mattei: His Challenge to the Faculty."

Analytical Laboratory, Vestry Hall,  
Paddington Green, W.,  
October 21, 1890.

Dear Sir,—On the 2nd of October I received from you three small bottles bearing the Government patent medicine stamp, each securely sealed with a wax, unbroken, seal of a castle on a rock. I have now carefully examined these chemically, physically, and microscopically, and I find as follows:—

They were labelled "Elettricità Bianca," "Elettricità Verde," and "Elettricità Rossa."

To find if they possessed any special electrical pro-

perties they were placed singly in thin glass tubes; these tubes were suspended by silk filaments. Under such circumstances an electrical body would point one end to the north and the other end to the south. Not one of these came to rest in such a position; neither were any of them attracted by a magnet, as an electrical body would be. Hence, they certainly are not electrical.

To delicate test-paper they were perfectly neutral. Vegetable extracts are usually either alkaline or acid; even if neutral when fresh, they speedily change.

They had the following characters:—

	Elettricità Bianca (White) Electricity.	Elettricità Verde (Green) Electricity.	Elettricità Rossa (Red) Electricity.
Colour	... None.	None.	None.
Odour	... None.	None.	None.
Taste	... None.	None.	None.
Polarity	... None.	None.	None.
Specific gravity (dis- tilled water = 1)	1.0006	1.0002	1.0002
Solid matter in 100 parts	... 0.01	0.01	0.01
Metals*	... None.	None.	None.
Alkaloids	... None.	None.	None.

\* By metals is meant any foreign to water, or any such as are used medicinally.

The microscope showed an absence of any floating particles or sediments, such as are usually present in vegetable extracts.

There is but one substance which possesses all the above qualities—that is, water.

None of these fluids differ at all from water in any of their properties.—Yours faithfully,

ALF. W. STOKES, F.C.S., F.I.C.,  
Public Analyst to Paddington, Bethnal Green and  
St. Luke's, Gas Examiner to the London County  
Council, &c.

As we then observed, there is really no room for comment. The Count has "beaten the record" in producing an article absolutely negative in its character; and there can be no other feeling than one of indignation when we think of the poor creatures who have been deluded into the use of the Count's specifics—white, green, and red. But, even in description of colour the Count has broken faith with his credulous customers, for, according to Mr. Stokes, the green and the red electricities are as devoid of colour as the white. Possibly the green may have been so named out of delicate compliment to the Count's admirers, while the absence of coloration may be intended to heighten the joke. If the Count has forgotten the colour he has not omitted the charge; for these *precious* electric remedies,

which, according to the Count's dupes will, when administered in drops, cure even cataract and broken bones, are sold at the rate of 3s. 9d. for a small phial containing three-fourths of an ounce.

Mr. Stead states, in his article, that, having had his interest in Mattei's preparations aroused, he determined to pay a visit to the Count, the article being a graphic description of his journey into Italy and of what he saw. Apparently, he went with his mind fully made up, for throughout the whole narrative we find nothing but the warmest admiration of Mattei and his preparations; to an extent, indeed, which in any other journalist would be startling. Unfortunately—we say this with all due regard for one who has made a deservedly prominent position in literature—Mr. Stead sometimes allows his sympathies to overcome his judgment, and that is the case in this instance. Otherwise he would not have resorted to such wholesale and unmerited abuse of the medical profession; nor would he have instituted a comparison between our Saviour and his Italian *protégé*.

Mr. Stead's challenge to the Faculty amounts to this:—Count Mattei believes in his remedies, and Mr. Stead believes in Count Mattei, and both are angry with the doctors because they do not blindly acquiesce in the same opinions. Count Mattei is willing, if only £5,000 to £10,000 be put down for the purpose, to submit his treatment to full scrutiny and test; and Mr. Stead makes a wild onslaught upon the doctors because they will not at once “plank down the money,” as our Transatlantic cousins would say. But, in the name of common-sense, why should they? The medical profession is not the best paid and least hard-worked as matters stand; its condition would become intolerable if to other duties were added that of experimenting upon every quack medicine at their own expense. Mr. Stead informs us, on the authority of the Count's business manager, that about a million phials of

granules and about as many bottles of electricities are sent out annually. Putting the phials down at 1s. each, as Mr. Stead does, we get a gross return of £50,000; add to this sum £100,000 for the million bottles of electricities (we reckon these at 2s. each only, though they sell, retail, for 3s. 9d.), and we reach a total annual income of £150,000—say, deducting one-third for expenses and free supplies, £100,000. Considering the cheapness of the principal—indeed, according to Mr. Stokes' analysis, the only—ingredient contained in the bottles of electricities examined by him, we think that the Count's income is of such a colossal character that he could provide, without missing so relatively small an amount, the £5,000 about which Mr. Stead taunts the medical profession. Count Mattei may well be pleased with his champion, but he would do well to avail himself of Mr. Stead's assistance while he is yet in the humour to render it. We read, only the other day, in the *Surrey Comet*, that Mr. Stead took an active part in a procession of admirers of one of the Sequah lecturers, whom a somewhat disorderly rabble escorted to his hotel after an evening meeting at Wimbledon. Poor Count Mattei! Who can describe the frame of mind into which he would be plunged if he learned some day that Mr. Stead had transferred his allegiance from the Italian quack to the Mock Medicine Man of the West? Let us charitably hope for the Count's sake that Mr. Stead's participation in the Sequah demonstration was merely another protest against the “orthodox Faculty.” Further, it would be such a pity, from some people's point of view, for Mr. Stead to ruthlessly neutralise all advantages derivable from his gigantic advertisement, in place of allowing it to lead up to a big company boom, in the form of “Mattei, Limited.”

According to the Sale of Poisons Act, it is specially laid down that certain regulations must be observed with respect to the selling of different poisons, the penalty for the breach of

these regulations being £5 for the first offence and £10 for each subsequent offence. It is enacted that on the sale of any of these poisons, the box, vessel, or cover in which it is contained must be labelled with the name of the article, the word "poison," and the name and address of the vendor. With respect to poisonous vegetable alkaloids and their salts (hydrochlorate of morphia, for example), no such article may be sold to any person unknown to the seller, unless introduced by some person known to the seller, and upon every such sale the seller must, before delivery, enter in a book to be kept for that purpose, the date, the name and address of the purchaser, the name and quantity of poison sold, and the purpose for which it is required, and must also cause the purchaser and the person introducing the purchaser to sign their names therein. Yet the provisions of this important Act are openly violated by the sale of preparations containing these poisons, and bearing the Government patent stamp. Take the case of chlorodyne, for instance. The analysis of the widest-known preparation bearing this name, sold as Collis Browne's Chlorodyne, was made for us, on January 17th, by Mr. A. W. Stokes, F.C.S., F.I.C., and that gentleman reported that in an ounce bottle, purchased at Messrs. Taylor's, in Holborn, he found six drachms of chloroform, a small quantity of Indian hemp, and six grains of hydrochlorate of morphia, with some unimportant ingredients. An analysis published by Dr. Wynter Blyth, in 1879, gave in addition to the various poisons enumerated by Mr. Stokes, twelve drops of Scheele's prussic acid in a rather larger quantity of chlorodyne. Now, supposing that the prussic acid is at the present time omitted, what conclusion can we come to as regards the two poisons in largest proportion, namely, chloroform and hydrochlorate of morphia, both of which are of course included in the schedule of poisons coming under the Act to which we have referred? The dose of hydrochlorate of morphia, when administered medi-

cally, is from one-eighth of a grain to half a grain, of chloroform three to ten drops. In one ounce of Collis Browne's Chlorodyne, by Mr. Stokes' showing, there would be the equivalent of twelve full doses of morphia and thirty-six full doses of chloroform. If a person wanted to buy six drachms of chloroform, he would very properly find considerable difficulty in procuring it; but put that amount into a bottle with other poisons, clap on a Government three-halfpenny stamp, and it can be bought with almost as much ease as the harmless treacle with which it is flavoured!

The quantity of this and similar chlorodynes sold is something enormous, far surpassing the imagination of anyone who has not given attention to the matter. Taken, at first, in small doses by the unhappy persons who drug themselves with chlorodyne, the victims become gradually habituated to its use, and many fall, sooner or later, a prey to the craving for morphia. This craving once established, they become as completely slaves to the practice of swallowing chlorodyne in extraordinary quantities as a Chinaman does to smoking opium, or a Malay to taking Indian hemp, with the inevitable consequence that physical, mental, and moral deterioration must follow.

A druggist in business at the West End recently mentioned to a friend of ours numerous instances of morphia-craving which had come under his own cognisance. One young woman purchased from him in a fortnight forty-two ounces of chlorodyne, the whole of which quantity she herself consumed. In another case, a man regularly bought every day for years a 4s. 6d. bottle. In a third, a lady customer ran up a bill for chlorodyne amounting to £13 in six months, in addition to what she paid for at the time of purchase. But even this last case seems moderate in comparison with that of the wife of a well-known actor, who in six months became indebted to her chemist for £90 for chlorodyne, a matter-

which the circumstance of the bill being disputed brought into public knowledge.

The revelations made at the inquest on Dr. Lyddon, in what was styled the Faversham Mystery, showed how feeble in body and mind the votaries of morphia-drugging become; while, in a still more recent *cause célèbre* in Paris, it was brought out in evidence that the unfortunate lady concerned had expended more than 25,000 francs (£1,000) upon the purchase of morphia, with the most baneful results to her physical and mental condition.

EDITOR.

## Dietetic Notices.

**CORALLINE.**—One of the chief novelties exhibited at the Second International Food Exhibition, held at the Agricultural Hall in November, was the dietetic article bearing this distinctive name, and gaining the well-deserved honour of the silver medal. It is a farinaceous substance, prepared from the choicest kinds of grain, and will be found a valuable addition to the dietary of both young and old, invalids or healthy persons. It is suitable for use at any meal, while it possesses the great advantage of requiring very little time or trouble in getting it ready for the table, as it has previously undergone a process of cooking in its manufacture. Further, it can be used in making cakes, buns, puddings, blanc-mange, and a large variety of dishes, and it produces excellent combinations with preserved fruits of all kinds. Coralline croquettes prepared according to one of the numerous recipes furnished by the Coralline Manufacturing Company are one of the daintiest delicacies imaginable. As soon as Coralline is better known it is sure to quickly "catch on" (to borrow an expressive phrase from our Transatlantic cousins) and to become a general favourite, on account of its excellent dietetic and hygienic qualities.

## Hygienic Notices.

**PURE OAKUM TOILET PAPERS.**—The well-known firm of Messrs. Burt, of the extensive paper mills at Witchampton, Wimborne, has long enjoyed an enviable reputation for its tough paper. Its cartridge envelopes are the stoutest and best in use, and rumour says that the Post Office finds them better than any others, and uses them extensively for foreign and oceanic packages. In another department, that of their elastic antiseptic toilet papers, a great field was open to them, and we have just been favoured with some oakum samples that have no equals, to the best of our knowledge, in the market. These papers are antiseptic, and tough to a degree beyond belief, while the price is so low that one wonders how the enterprising makers can hope to cover expenses. The retail price is positively only sixpence a ream. This may possibly be accounted for by the low wages of the district—wages, however, on which the workpeople live in greater comfort and enjoy better health than their more highly-paid brethren in large towns on double as much.

## Correspondence.

### CHEAP FOOD, OR WANT.

*To the Editor of HYGIENE.*

SIR,—Want or semi-starvation for the masses, the impoverishment of many capitalists and manufacturers, and agitations leading possibly to riots, appear to threaten, unless cheap, healthy, abundant food is speedily secured for our poor and comparatively poor.

(1.) Man by labour or inherited labour, called wealth, must get fed regularly and fed cheaply. His digestion requires a wide and varied diet. In our cold, damp climate, where sunshine is comparatively rare, every man

should obtain at least one daily meal of fish or meat.

(2.) Owing to faulty distribution and preservation, much of the fish and meat consumed by the poor is often wretchedly inferior and exorbitantly dear. Hence, perhaps, their excessive tendencies to alcoholic drinks and tobacco, which at least please their palate.

(3.) The foreign or colonial producer provides cheap excellent frozen meat, poultry, and game which too rarely reach the consumer except when sold as, and at the high prices of, home-bred, fed, and killed animals. Legislative interference should prohibit such fraudulent trading.

(4.) Our fresh food markets, whose charters were granted to bring the producer and public together, are now usurped by a handful of capitalists who have cleverly cornered the public markets and their entire fresh food supplies so as to sweat the producer, semi-starve the masses, and over-charge the classes.

Cobden's free-trade principles have been so engineered that the producer gets no profit because the middlemen gain all.

As regards fish the Billingsgate ring excludes the public, the fishmongers, and the costermongers from purchasing except from the ring, who cling to perpetuating Billingsgate market with all its avoidable abominations and augmenting abuses.

Hence stale fish continues at famine prices, instead of cheap, fresh, imperishable fish.

Every day of the year 2 lb. of bled, gutted, cleaned, dry-air frozen (imperishable) fresh herrings (about six fish) could be profitably retailed by costermongers for one penny, or 2 lb. of sprats for one halfpenny.

(5.) The Billingsgate ring, by a shrewd system of cruel crushing mortgages on the uncaught and caught fish, enslave and impoverish the indebted fishermen.

According to Cahill's evidence before the Corporation Fish Enquiry, 1881; "The practice in Billingsgate Market is that its ring realises

the highest price it can and returns the sender what is expedient, or what may be agreed on among its members. This ring very often after agreeing on the price to be sent to the senders so distrust each other that they exchange account sales enclosed in open envelopes, so that 'A' reads, seals, and posts 'B's' sales, and *vice versa*." (Pages 656 and 657 of the published report.)

To keep up the price, much fish is destroyed by the ring, who ruin our national fisheries and fishing industries.

(6.) Our manufacturers will soon be unable to compete with foreigners, who obtain cheaper labour owing to their getting cheaper food.

Hence the land, buildings, and plant of the British manufactories will suffer increasing depreciation, their labourers, and those dependent upon the earnings of the labourers, will find their occupation gone.

(7.) Large pauper, police, prison, and asylum establishments, an expensive army and navy being fed by the public purse, dear food means sweating the taxpayer.

(8.) Hence the question of cheap, healthy, abundant food should be carefully considered by Parliament and the County Councils.

(9.) By means of retail stores, and costermongers for the poor, the producer should sell fresh food direct to the consumer.

I am, Sir, yours, &c.,

J. LAWRENCE-HAMILTON, M.R.C.S.  
17, Burlington Street, Brighton,

January, 1891.

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FRUIT GROWING is finding more favour amongst our agricultural population. According to the Agricultural Returns for 1890, the acreage devoted to the growth of small fruit trees—strawberries, currants, gooseberries, &c.—was 4,300 acres more than were similarly employed in the previous year. In 1873 there were not 150,000 acres of orchard land in Great Britain; now there are 202,305 acres used for orchard cultivation.

## Rates and News.

**FRENCH WINE.**—The quantity of wine made in France last year amounted to six hundred million gallons, being eighty million gallons in excess of the production of the previous year. Yet, owing mainly to the ravages effected by the phylloxera, and the consequent decrease of the vintage, the imports of wine into France from other countries now amount to two hundred and twenty million gallons per annum, instead of forty-five million gallons only, as was the case previous to the appearance of that pest.

**VENTILATION.**—One of the leading London banks, viz., that of Messrs. Barclay, Bevan, Tritton and Co., has lately been successfully fitted up with ventilating apparatus, in accordance with Mr. Hoey's system. The outlet of air is arranged by a vertical shaft with a sectional area of twenty square feet, rising to a height of seventy feet above the ground level, and surmounted by a revolving cowl. The inlet ventilation is by means of fresh-air reservoirs, in which the hot-water pipes and coils are enclosed. Thorough ventilation without draught, and with an even temperature, is thus insured, as the entire atmosphere of the bank is unintermittently and automatically changed twice in every hour, while the flow of air can be increased if it be deemed necessary.

**POLLUTION OF RIVERS.**—The Secretary to the Yorkshire Fishery Board reports that the pollution of rivers in that district is markedly on the increase, and that our English salmon fisheries may be regarded as doomed, unless adequate steps are speedily taken for the redress of this evil.

**CHOLERA AT VLADIVOSTOCK.**—The latest intelligence from this Russian settlement is that the epidemic is not as yet diminishing. The Russians do not suffer in proportion to the natives; a circumstance readily accounted for by the utter disregard of all sanitary precautions on the part of the Mansas.

**HIGH-PRICED TEA.**—At a recent sale of tea by auction at the London Commercial Sale Rooms, a consignment of tea from the Galle-bodde Estate, Ceylon, was sold at the extraordinary price of 87s. per pound to a wholesale firm, who have since disposed of it by private sale at £5 10s. per pound, a figure never before approached in the records of the trade. The leaves of this remarkable tea are said to be of the brightest golden colour.

### THE NECESSITY OF SELF-HELP.

*"How small, of all that human hearts endure,  
That part which lords or kings can cause or cure,  
Still to ourselves, in every place consign'd,  
Our own felicity we make or find."*

These lines added by Dr. Johnson to Goldsmith's poem of the "Traveller," with Goldsmith's consent, are worthy of consideration, especially when one feels disposed to repine at his ill-fortune, or to submit without an effort to every disaster that may threaten him.

**NOT REDUCED TO WATER-DRINKING.**—An amusing story is told in connection with Mr. Bailey Denton's visit of inspection into Somersetshire. Some shallow, muddy pools, hollowed in the lias formation, formed the only water supply of a certain village. When he arrived there, Mr. Bailey Denton was horrified at the mud-holes whence, he presumed, the villagers obtained their drinking-water. Turning to the hale old native who acted as his guide, Mr. Bailey Denton exclaimed, "Is this the water you drink?" "What did you say, zur?" was the surprised reply, and the question had to be repeated more than once before the Somersetshire man could grasp its drift. At length he did so, and, with a burst of hearty laughter, he cried out: "Oh, Lard bless 'ee, noa, zur; we doan't drink no watter down here; we've got plenty of good zider in Zummerzet!"

**INFLUENZA** is commonly associated in our thoughts with cold winds and chill weather, but it would seem that this epidemic can make itself at home under any climatic conditions, even in the most sultry parts of Africa. Consul

John Buchanan, writing from Zomba, situated in the Shiré Highlands of Central Africa, our new Protectorate, on October 11th, the hottest period of the year there, says:—"Influenza has been a most severe epidemic here. A good many people have died, both young and old. Most of the Europeans at Blantyre have had it in a more or less severe form."

**SMALL-POX.**—During the second week of January not a single death from this disease was registered in the twenty-eight largest towns of England and Scotland.

**SHORTSIGHTEDNESS**, upon which subject an article appeared in the January number of *HYGIENE*, is largely increasing in Germany. Professor Cohn, of Breslau, reports that the result of his examination of the pupils in twenty-four schools showed that out of 9,244 scholars, 37 per cent. were shortsighted. The percentage was much greater in the advanced than in the elementary classes. The principal causes to which Professor Cohn attributes the prevalence of shortsightedness are too excessive hours of study, dark rooms, unfavourable colouring of the walls, faulty position of the pupils when sitting at their desks, and the small type of many of the text-books used in the schools.

**CREMATION.**—Within the past few weeks the remains of three well-known persons have been cremated at Woking Cemetery, viz. Baron Huddleston, Mr. A. W. Kinglake, the historian, and the Duke of Bedford. The last-named was a great supporter of the Cremation Society, to the funds of which he contributed altogether more than £3,000. Since the erection of a crematorium at Woking, the annual number of cremations has steadily increased. In the first three years, 1884-7, there were twenty-six cremations; in 1888, the number was twenty-eight; in the following year (1889), there were forty-six; and from the commencement of 1890 up to the middle of January the number was seventy-three.

**THE CLIMATE OF THE ISLE OF MAN** is much milder than the majority of our readers would at first thought imagine. We learn from a correspondent there that during the past trying period of two months in all parts of England, a large number of men (nearly 200) have been engaged in outdoor work, constructing the new Marine Drive along the cliffs from Douglas Head to Port Soderick, without any intermission; also, that early primroses, &c., have been plucked in different localities. This carries out what we said of the mildness of the climate of the Isle of Man in the article on that place as a health-resort, published in *HYGIENE*, for August, 1890.

**ST. PETERSBURG.**—The recent census taken shows the population of this city to be 956,226, against 929,093 in 1881.

**"OVERLAYING."**—In the third week of January, the deaths of no less than seventeen infants under one year of age were registered as arising from "suffocation in bed."

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## PUBLISHERS' NOTICE.

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# HYGIENE,

*A Monthly Sanitary and Social Magazine.*

No. 37 (for JANUARY) began a new volume (Vol. IV.)

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# HYGIENE.

A MONTHLY SANITARY AND SOCIAL MAGAZINE.

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MARCH, 1891.

No. 39.

## ON VENTILATION, WARMING, AND LIGHTING.

By SIR DOUGLAS GALTON, K.C.B.,  
D.C.L., F.R.S.

[*A Lecture delivered at the Sanitary Institute,  
February 3rd, 1891.*]

I HAVE been asked to lecture to you this evening upon the principles of Ventilation, Warming, and Lighting.

These subjects are intimately connected together in their practical application; but in my address to you it will be convenient to treat them separately, and to divide my remarks into distinct heads.

For Ventilation I propose to classify my remarks under—

- (1) Necessity for ventilation in confined spaces occupied by human beings and animals;
- (2) Laws which regulate the movement of air;
- (3) Practical application of these laws.

Owing to the very short time at my disposal, my remarks on warming will be necessarily limited to explaining the general conditions which govern combustion and the transfer of heat, and my remarks on lighting will be limited to explaining the effects of different methods of lighting on the purity of the air.

### 1. Necessity of Ventilation in confined spaces occupied by human beings or animals.

Human beings and animals are continually throwing off emanations which vitiate the air in their vicinity.

Out of doors the movement of the air carries the impurities away. For instance, air out of doors seldom moves at a less rate than six feet per second. The average rate of movement of air in England is about seventeen feet per second. It has been calculated that at the lower rate more than 200,000 cubic feet of air per hour would pass over the space occupied by a human body out of doors.

In a room, or closed space, these emanations would not be able to escape, and would by degrees vitiate the whole air in the closed space, unless special arrangements were made for removing them.

But if it were desired to supply in the room a volume of fresh air comparable with that supplied out of doors, it would be necessary to change the air of the room from twice to six times in every minute; but practically this would be an impossibility, and even if it were possible it would entail conditions very disagreeable to the occupants.

You cannot, of course, expect to obtain indoors the same degree of purity of air which prevails outside. You must, therefore, seek to ascertain what is the extent of impurity which

it will be safe for your health to permit in the air of a room, rather than to seek for a standard of purity in the air comparable with that which exists out of doors.

Air in connection with human beings is rendered impure by the action of breathing, and by emanations from the skin, etc. The act of breathing absorbs oxygen, and gives out carbonic acid. Normal air contains about four volumes of  $\text{CO}_2$  in 10,000 volumes of air. In the open country it has been found to contain as little as three parts in 10,000 of air. It is rarely found to exceed from twelve to sixteen parts per 10,000 in densely-populated spaces.

No doubt over brewers' vats a much larger amount may be often inhaled with impurity. But in air which has been breathed there is, in addition to the carbonic acid, a considerable quantity of organic matter thrown out from the body, and it is mainly from this cause that rooms become close which contain many people and in which the air is not changed.

Therefore, although the carbonic acid present in air which has been breathed may not be sufficient in amount of itself to be injurious, the presence of carbonic acid has been generally taken as a convenient test of other impurities, mainly because the extent of  $\text{CO}_2$  present in air is ascertainable with comparative ease. Where the amount of carbonic acid present in air which has been breathed is found to exceed from six to eight parts in 10,000, the air is found to be very close. The amount of  $\text{CO}_2$  present being thus a proportionate consequence of the fouling of the air, either by respiration or combustion, it has been taken as a fair criterion of the contamination which has within certain limits taken place.

Another source of injury to air from animal life arises from the aqueous vapour which is thrown off in the process of breathing as well as from the skin.

Vapour exists in the atmosphere at all temperatures, even below the freezing point of water.

The amount of vapour which can be held in suspension in air depends upon the temperature of the air.

Air is said to be saturated when the temperature of the air cannot be diminished without depositing water upon the walls of the containing vessel, and appearing as a mist.

If the temperature of saturated air be raised it will become drier to the feelings, and immediately begin to take up water which is exposed to it.

Air is dry or moist, not in proportion to the actual quantity of water which it contains, but in proportion as it is more or less removed from the point of saturation.

The point of saturation rises more rapidly than the temperature. A quantity of air absolutely humid at 32 deg. Fahr. holds in solution an amount of vapour equal to  $\frac{1}{160}$ th part of its own weight; at 86 deg. it holds as much as  $\frac{1}{40}$ th; and at 140 deg. it will hold  $\frac{1}{10}$ th of its own weight.

Consequently, while the temperature advances in arithmetical progression, the power of air to retain vapour rises with the accelerating rapidity of a geometrical series.

After continued cold weather, when our houses have been throughout reduced in temperature, and a warm moist wind succeeds, we perceive that moisture collects upon the walls and furniture, or any other cold object; the cause of this deposit is to be found in the fact that the air in immediate contact with these objects is lowered in its temperature, and, being already nearly saturated, all the vapour above that due to this lower temperature immediately appears in the form of minute drops.

A glass tumbler filled with cold water in summer is soon bedewed with moisture, because the air around it is cooled, and its moisture precipitated upon it; the same will occur in winter if the tumbler were brought into a close room in which many persons were assembled, and the air loaded with the accumulated vapour exhaled from their lungs and skin.

In order to appreciate the bearing of this on ventilation, it is necessary to consider the relation which the sense of cold or warmth in the human body bears to different temperatures in air laden with varied proportions of humidity.

The natural heat of the body is being constantly supplied by the agency of the food which we consume and the air which we breathe.

The heat generated in the body is lost partly in the air expelled by the breath, partly by evaporation of moisture from the skin, partly by conduction into matter in contact with the body, and partly by radiation to surrounding bodies.

A moist atmosphere will check the insensible perspiration, but in proportion as it is below the temperature of the body it will assist the loss of heat by conduction. Thus a saturated atmosphere at from 35 deg. to 40 deg. Fahr. will be found to be intolerably chilly; for although the evaporation from the body may be checked, and this source of loss of heat removed, yet the conduction and radiation due to the vapour in the air will be enormously increased.

For instance, a Scotch mist of 36 deg. Fahr. (which is supersaturated with vapour) feels very chilly, whilst, on the other hand, a temperature of about 60 deg. in a nearly saturated atmosphere feels comfortable, because it seems to provide an equilibrium between the cooling action by conduction and radiation, due to the vapour in the air and the supply of heat from the checked evaporation from the body.

A temperature of from 75 deg. to 80 deg. Fahr., with a saturated atmosphere, becomes sultry and oppressive because the surplus heat cannot be removed by conduction or radiation; and as the natural effort of the system is to relieve itself of heat by producing evaporation, the least physical effort induces perspiration and causes lassitude unfavourable to mental and physical labour.

Above 80 deg. Fahr. a saturated air becomes most oppressive, and it is questionable whether life could be prolonged in a saturated atmosphere of 90 deg. or 100 deg.

Bearing in mind these facts, we come to the question of what is the quantity of air which should be allowed per person in an occupied room.

Assuming 75 per cent. of complete saturation to be an admissible degree of moisture in the atmosphere, every man gives off from the lungs and skin each hour enough moisture to raise the humidity from 70 per cent. to complete saturation in 500 cubic feet of air at 60 deg. Fahr., and to raise it to 82 per cent. in 1,500 cubic feet. Now, to reduce this amount to 75 per cent. would take 3,000 cubic feet of air saturated at 50 deg. Fahr.

Thus, according to theoretical calculations, it would appear that with an initial air-space of 1,000 cubic feet occupied by one individual, it would be necessary to supply 3,000 cubic feet per hour to maintain the room in a proper condition of humidity.

As regards other impurities, if two parts in 10,000 of  $\text{CO}_2$  are accepted as the limit of respiratory impurity in a well-ventilated air-space, in addition to the four parts per 10,000 in normal air, it will appear that it requires 3,000 cubic feet of air constantly supplied per hour to preserve the air-space in the required state of freshness.

Thus the theoretical calculations, based first upon humidity, and secondly on carbonic acid, bring us to similar conclusions in each case.

Other causes of impurity of air in occupied rooms arise—

Firstly, from combustion in the case of the production of artificial light and the generation of heat (the general conditions relating to these causes of impurity will be alluded to in my observations on lighting and warming); and secondly, from the presence in the room of food, and other matters which give off vapour, to which it is not necessary here to allude.

2. *Laws which regulate the movement of air.*

All natural movement of air is ultimately dependent upon changes of temperature. That is the cause of hurricanes and winds, and it is also the cause of movement of air in buildings.

Air consists of oxygen and nitrogen, in the proportion of 210 parts of oxygen to 790 of nitrogen to form 1,000 parts of air; and, as has already been mentioned, there may always be detected in samples of air a small quantity of carbonic acid and vapour of water, and also ammonia and suspended matter.

Air of the composition before mentioned, viz., 210 of oxygen to 790 of nitrogen, is a heavy body. At a temperature of 32 deg., and with the barometer at 30 inches—which is about the mean sea level—dry air weighs 566.85 grains per cubic foot. The pressure of the atmosphere on any surface is nearly 14.7 lb. to the square inch; and a column of air of about 87.6 feet in height, under these conditions, will balance a column of mercury .1 (or one-tenth) of an inch in height.

The molecules of air are but feebly attracted to each other, and small increases of temperature or slight diminutions of pressure separate the particles from one another, and thus one cubic foot of expanded air weighs less. Similarly small decreases of temperature bring the particles nearer together, and make the cubic foot of cold air heavier than the standard above mentioned. This expansion and contraction are equal for equal increases or decreases of temperature.

This increase of volume amounts to 0.365, or about three-eighths of the original bulk of the air in the process of being heated from the freezing to the boiling point of water, or nearly .00203 feet for every degree of Fahrenheit.

Thus, if the air inside a room were 20 deg. Fahr. warmer than the air outside, the air in the room would be expanded to a twenty-fifth part more in bulk, and would to that extent be specifically lighter than the outside air.

The following table shows the density of air at different temperatures:—

WEIGHT OF AIR PER CUBIC FOOT UNDER THIRTY  
INCHES PRESSURE OF MERCURY.

Temperature Fahrenheit. Degrees.	Dry Air.	Air saturated with Vapour.
	Grains.	Grains.
0 .....	606.37 .....	606.03
32 .....	566.85 .....	565.58
60 .....	536.28 .....	532.84
100 .....	497.93 .....	486.65

The dilatation of air by heat and its contraction by cold are expressed by the formula  $V_1 = (1 + at) V$ , when  $V$  = volume at 32 degs. and the barometer at 30 degs.

$V_1$  = volume at the temperature of  $t$  degrees above 32 degrees.

$a$  = co-efficient derived from experiments of proportion of increase of volumes of air in each degree of elevation of temperature =  $\frac{1}{49.1}$  for each degree of Fahrenheit = .00203.

When temperature is decreasing, formula is  $V_1 = (1 - at) V$ .

When the temperature of air and the space it occupies increases, its density, that is its weight per cubic foot, decreases in the ratio expressed in the following formula, assuming barometric pressure constant:—

$$d = \frac{d}{1 + at}$$

As warmed air expands it ascends, and as cooled air contracts it falls. It follows that as the warmed air ascends, the air around rushes in to fill its place. The sun's rays, the proximity of a warm body, the vicinity of a cool shaded surface, all cause movements in the currents of air.

For instance, in this room as air is warmed by your bodies, it ascends—it comes against the glass of the windows, cools, and falls down.

It is on this law of the dilatation of air that all the movement of air depends, from the winds and hurricanes to the ventilation of our houses, except where we propel air by fans or other mechanical appliances.

The law which regulates this movement of the air in a confined space, when the tempera-

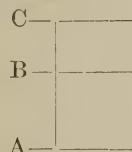
ture is higher than that of the outside air, depends upon the following considerations:—

1. Upon the difference of temperature of the air inside the confined space, as compared with that outside.

2. Upon the area of the aperture through which the air passes.

3. Upon the height of the column of ascending air.

If A B represent the height of a column of air of the outside temperature  $t$ , and A C the height of a column of the same quantity of air expanded by the warmer temperature  $t_1$ , then the velocity at which the warmer air ascends will be that which would be acquired by a body falling from C to B.



That is  $V = BC \times 2g$ .

If  $V$  = velocity in feet per second,

$H$  = height of shaft,

$t$  = temperature in shaft,

$t_1$  = temperature out of doors,

$a$  = the coefficient of dilatation of air, which for 1 deg. Fahrenheit = .00203;

The theoretical equation becomes

$$V = 8.024 \sqrt{H a (t - t_1)}$$

The actual movement of air in a chimney is very different. It is diminished by the resistance from friction, which increases directly with the length, and inversely with the diameter or area of the flue; and it also increases with the square of the velocity of the air currents. The resistance is, moreover, much influenced by the material forming the sides of the flue; with a sooty flue the velocity with equal temperatures has been found to be one-half that of a clean flue.

The velocity is, moreover, diminished by any impediment to the ingress of the fresh air required to supply the place of that which

flows out; and therefore an efficient system of ventilation requires that the extraction of air should be accompanied by arrangements for the supply of fresh air.

Péclet, in his treatise on the application of heat, has given a formula to include some of these resistances, viz. :—

$$V^2 = \frac{2g H a (t - t_1) D}{D + 2g H K}$$

When  $D$  = diameter of chimney

$K$  = co-efficient of resistance, which varies with different chimneys.

Péclet determined the resistance for—

Pottery chimneys = .0127

Sheet iron = .005

Cast iron = .0025

Experiments published by Mr. Wyman showed a variation between this formula and experiment of from 15 to 20 per cent.

For these reasons it is preferable in estimating the amount of air removed for purposes of ventilation from buildings already constructed, to measure the actual volume of the air in the flues or air-passages, that is to say, to cause it to pass along a channel the size and area of which is known—and then to measure the velocity with which the air passes through this channel. The multiple of the area into the velocity in a given time gives the volume which passes through in that time.

There are various ways of measuring the velocity. It may be done by puffs of vapour of turpentine, by balloons filled with hydrogen and weighted to be of the exact specific gravity of air. A very convenient instrument is the anemometer, of which I give a specimen. The vanes are turned by the air, and the number of revolutions which are recorded by the counter gives the velocity. Of course, the value of each revolution has to be ascertained in the first place by direct experiment, that is, by forcing a known bulk of air through a channel of a given size.

You will see from the formula that the velocity will vary either with the height of

the shaft or with the temperature of the shaft—the latter depends upon the fuel consumed to increase the temperature.

Therefore, the economical application of the law of dilatation of air depends on the height of the shaft available.

The system to which these calculations apply is termed Ventilation by Extraction.

It is the system universally prevalent. The open fireplace is one example of it, the sun-burner is another example; but the system is also applied in every room in which there is an opening at the upper part out of which the warm air can pass, and an opening below, through which fresh air can flow in.

Thus, an ordinary sash-window is an example. If the top sash is lowered, and the bottom sash raised, the warmed air passes out of the room at the top, and the cooler air flows in below.

Extraction of air can also be obtained by means of fans. The change of air in a room may also be effected by forcing air into the space to be ventilated, and thus compelling the air already in it to find its way out. This system is termed ventilation by propulsion.

Dr. Arnott proposed an apparatus on the principle of the gas-holder, by which he could carefully regulate the quantity of in-flowing air. In the House of Commons there is an apparatus of this description, by which, in the summer, a given quantity of cooled air can be forced in.

It may be broadly stated that wherever the ventilation requires to be applied at intermittent periods, as in a church—which is very fully occupied for a short time only, and at long intervals apart—or a theatre, or even in some cases a schoolroom, the use of a fan may be convenient, and found more economical than the chimney-shaft, although, undoubtedly, the latter is better adapted to continuous use, because the chimney-shaft, when once built, requires little repair, and no skilled labour to look after it.

#### *Practical application of these laws.*

I will now pass on to explain certain methods of ventilation in use.

Simple forms of ventilation are shown on the diagrams. They exhibit the principle of an outlet for the warmed air and an inlet for fresh air.

The position of the inlet is of material importance, because the question as to whether draughts are felt or not, to a great extent depends upon the way in which the in-flowing air is admitted.

A cold current of air impinging on some part of the body, and thus causing some local disturbance in the circulation, gives the sensation which we term a draught.

Hence the comfort of ventilation depends upon letting the air flow into a room at such a temperature, with such a velocity, and in such a position as will prevent the inmates from feeling sensation of cold or draught.

The feeling of being in a draught is also occasioned by the radiation of heat from your body to an adjacent colder surface.

For instance, if the brick wall of a house is cold, and you in a warm condition sit down near it, you may feel a draught. This may, no doubt, be partly owing to the air of the room being cooled by contact with the wall, and falling upon you; but it is principally caused by the radiation from that part of your warm body nearest to the cold wall.

To prove that, you have only to hang a piece of carpet between you and the wall, and the feeling of cold will cease.

This question of radiation much affects the question of comfort in ventilation.

The velocity of the air as it flows in and out of a room, as measured at the openings for admission or exit, should not exceed one foot, or at most two feet, per second; first, in order to prevent a sensible draught being felt; and second, because a low velocity is favourable to the uniform diffusion of the incoming air through the air of the room.

A very simple method of measuring low velocities is to use the flame of a candle. A flame inclined at 30 degs. to the horizon gives a velocity of 1 ft. 6 in. per second, and at 60 degs. to the horizon a velocity of 6 in. per second.

There are various methods in use for diminishing the velocity of air in entering a room. One is the whirligig you see in cottage windows sometimes; another is to make a comparatively small aperture outside, and to expand it into a much larger aperture inside.

Although a draught is more readily experienced from cold air, it would be felt even with warmed air unless the temperature of the air nearly approached that of the human body.

For this reason it is desirable to admit fresh air, especially cold air, at the upper part of the room above the heads of the occupants, and to break up the stream by admitting it at numerous inlets. It thus becomes more readily warmed by the air already in the room.

The Sheringham Ventilator is admirable in this respect—that it is placed near the ceiling, and the incoming air is thrown upwards.

Another of the designs given shows a Watson Ventilator, which is applicable in the case of places where there is no other inlet for fresh air. The ventilation in this case is obtained by dividing a shaft into two parts by means of a vertical diaphragm, and carrying up the shaft on one side, rather above that on the other; thus an upward current is produced in the longer limb, and the fresh air flows down the shorter limb.

The velocity of air-flow in the up-cast shaft in this case depends upon the difference of length between the long and short limb, which is very small, and therefore, to produce an adequate effect, a large area is required. This is a very convenient method of ventilation in large halls and churches, when the doors and windows are closed, and when the warming is effected by hot-water pipes or close stoves, or by some means independent of ventilation.

The action of this ventilator is, of course,

completely altered if air is admitted in the lower part of the room, for then an upward current would prevail in both shafts.

Sir Joshua Tebb proposed ventilating beams for barracks; that is to say, he carried a hollow beam across a barrack-room, terminating on each side in the open air. He made holes on the side of the beam, and placed a diaphragm in the middle to stop the passage of air. When the wind blew on one side of the barrack, the air passed into the beam on one side, and being arrested by the diaphragm, it passed out into the barrack-room through the openings in the beam, whilst the air in the room found an outlet through the other portion of the beam beyond the diaphragm into the open air.

The same result would be obtained in cases of rooms having windows on opposite sides, by opening slightly the opposite windows at the top, or by placing Sheringham valves on opposite sides of a room.

I would now call your attention to the ventilation of barrack-rooms. In the ventilation of barrack-rooms the extraction and admission of air was partly arranged in connection with the chimney flue of the open fire, and partly by shafts carried from near the ceiling-level in the room to above the roof, which have a very powerful effect in improving the ventilation. These shafts act by natural means alone. For their action to be successful they must be accompanied by adequate inlets of fresh air.

In barrack rooms these inlets were twofold. There were inlets direct from the outside which could be to a great extent closed, and there was an inlet for fresh air to a chamber behind the fire-place, where the air was warmed by the fire and passed into the room at a point in the chimney-breast.

The chimney flue when a fire is lighted acts as a very powerful extraction shaft. With a very bright fire the temperature in the flue may suffice to remove from 40,000 to 50,000 cubic feet of air per hour.

The action of the shafts is due to a certain

extent to the difference of temperature within the room and outside, but it is also largely dependent upon the movement of the air outside.

Thus, if a wind be blowing across the top of the ventilating tube, a very large amount of air will pass up through the tube. If the tube be an open one, the maximum effect due to the area at the top of the tube will be produced. If the top be protected by a cover or cowl, the proportion of air removed will be dependent on the form of cowl.

If the area exposed to the action of the wind by the cowl be not greater than that afforded by the open tube, it may be safely asserted that the open tube will have the best effect.

On the other hand, if the area so exposed by the cowl be greater than that afforded by the open tube, then the cowl may produce better results.

These shafts and inlets with warmed air in barrack rooms produce satisfactory results. In cold weather they act rapidly, in warm weather they can be supplemented by open windows; but to be successful they must be proportioned in size to the duty which they are required to perform, and the provision of inlets is as essential as that of outlets.

It must, however, be observed that the success of these, as well as of any other methods of ventilation, lies in the temperature of the fresh air being maintained at a sufficient point for comfort.

*Principles which affect the warming of air.*

It is quite impossible in this lecture to do more than give a summary of some of the main principles or axioms which govern this very intricate subject.

In this country our houses are all warmed by heat derived from coal, or the products of coal, such as coke or gas. The usual plan is to use raw coal. It creates dirt and dust in a room; it sends up smoke and soot into the atmosphere; and makes town fogs blacker and more persistent than they would otherwise be. Yet,

with all its imperfections, it is on the whole the cheapest and most convenient form of obtaining heat for our climate. Coke is free from some of these imperfections, and gas would be an eminently clean fuel.

Gas made for illuminating purposes, is, however, too expensive for a fuel.

At 3s. per thousand cubic feet, it may be assumed to cost nearly three times as much as coal. But it is quite certain that if gas were made for heating purposes only and were sold at 1s. 6d. per thousand cubic feet, the use of gas would obtain a very great extension, because it can be applied so conveniently and regulated so easily, but a gas fire produces so much lower a temperature than a coal fire in the chimney that it does not assist ventilation to the same extent, but on the contrary may produce disadvantages.

Oxygen required for combustion is supplied by air.

The nitrogen of the air passes through a fire without material alteration, and is indeed a source of loss, because it has to be warmed in order to be carried up the chimney.

The air which has passed through a fire retains a considerable proportion of its normal quantity of oxygen, and therefore for practical purposes of combustion the supply of air to a fire should be increased beyond the quantity which theoretical considerations show to be necessary, in the ratio of nearly two to one.

It may be assumed that one pound of coal or charcoal requires for its combustion about 300 cubic feet of air at 62 deg. Fahrenheit.

If the air supply is insufficient the combustion is imperfect.

With imperfect combustion not only is much impurity thrown into the atmosphere which would not be the case with perfect combustion, but much of the heat which might be evolved from the coal is lost.

Thus, when the supply of air is insufficient, carbonic oxide is formed, which may be detected in a blue-coloured flame.

The heat evolved in forming carbonic oxide is much less than that evolved in the formation of carbonic acid ; therefore it is wasteful to burn coal with an insufficient supply of air, in such a manner as to allow of the formation of carbonic oxide, instead of carbonic acid gas.

The primary condition for the prevention of smoke is the complete combustion of the fuel ; to effect this the combustible gas should be intimately mixed with air, and the mixture should be effected at a high temperature.

The grates and stoves which would fulfil these conditions in the most perfect way are those which would not only avoid smoke but would also develop most heat out of the fuel.

Conduction is the transference of heat from one body to another, by means of some tangible or invisible medium which fills the whole space between the two bodies.

For instance, if a poker be held with one end in the fire, the heat from the fire is transferred along the poker to the hand by conduction.

Convection is the transference of heat from one place to another by the bodily moving of heated substances.

The warming of a building by hot-water pipes is an instance of transference of heat both by conduction and convection. The heat from the fire is, in the first place, communicated by conduction through the plates of the fire-box, from the incandescent fuel to the water in the boiler. It is transferred by convection along the pipes which convey the water to different parts of the building, as the hot water circulates. It is again transferred by conduction to the air close to the pipes. This air, being expanded, ascends, and carries the heat with it by convection to different parts of the room.

Radiation is a form of the transference of heat which is not either conduction or convection by ordinary matter. That is to say, heat, which is transmitted in a manner of which all we know for certain is, that it is not convection or conduction by ordinary matter, is called radiant heat. If you stand opposite a blazing

fire you are warmed by the radiant heat which passes through the intermediate air to your body.

In a homogeneous medium radiant heat is propagated in straight lines.

It is propagated with less velocity in a dense medium than in a rare one. For that reason on the top of a high mountain when the air is rarefied the sun's rays are intensely hot, but when these rays are withdrawn by clouds, or at night, the cold becomes intense.

The amount of heat radiated from a body at a given temperature depends on the physical nature of the surface of the body.

If a cube be made of tin, and filled with hot water, and one of the sides blacked, and another left bright, much more heat will be radiated from the black surface than from the bright one.

The hotter the body in proportion to an adjacent body, the greater proportionately will be the rapidity with which it emits radiant heat.

I have already mentioned an instance of this, viz., how, if you, in a warm condition, sit near a cold wall, the radiation from your body to the cold wall will make you fancy that you feel a draught.

Radiant heat warms to a greater or less degree the solid bodies upon which the rays impinge, but passes through the air without warming it.

All these considerations have an important bearing on the warming of our houses, in affecting which object we usually resort to one of these methods :—

1. The open fireplace in each room.
2. Warmed air brought into the rooms or corridors by flues from a centrally placed calorigen.
3. Close stoves, placed in the room or corridor to be warmed ; or else hot-water pipes, or steam-pipes heated by a boiler in some central position, and carried by the pipes thence to the places where the heat is wanted.

The heat conditions which prevail between

the air and the walls or objects in a room are different in each of these cases.

If there is a bright fire in the room, the rays from the flame and incandescent fuel convey warmth to the walls of the room, whilst its rays leave the air to be breathed cool, and there is no doubt that the perfection of ventilation would be to have cool air to breathe, but to be surrounded with warm walls, floors, and furniture, so as not to feel ourselves parting with our heat to surrounding objects.

Besides this, the open fire enables each occupant of a room, by selecting his position, to regulate according to his wishes the amount of heat he desires to obtain from it.

Unfortunately, we have never succeeded in preventing the open fire from injuring our atmosphere by the smoke which it emits at times.

When hot air is conveyed from a stove or other central source of heat in the basement by flues into a room, it is necessarily warmer than the walls, consequently the walls and furniture of the room are warmed by means of the heat conveyed to them by the heated air, and are thus necessarily cooler than the air itself.

The warmed air is less pleasant and invigorating to breathe than cold air. If you take two equal volumes of air, one heated and the other cold, the expanded heated air will contain less oxygen per volume than the colder air. The warmed air necessarily leaves the walls colder than the air of the room, and the heat of the body is radiated to the colder walls. The only way of avoiding this cause of discomfort would be to raise the temperature of the warmed air beyond what is either comfortable or healthy for breathing; and thus, if you obtain your heat by warmed air alone, discomfort in one form or the other can with difficulty be avoided.

It follows that if we desire to have comfortable rooms warmed with hot air, we ought to make that air pass under the floor, and through spaces reserved in the walls, so as to warm the

floors and walls before it enters the rooms, and then we should not suffer from cold walls, or have the discomfort of radiating away the heat of our bodies.

On the other hand, stoves or pipes warm the air in contact with them, and give out a proportion of radiant heat, which passes to the walls of a room, dependent upon the degree of heat to which they are warmed.

Thus with ordinary low pressure hot-water pipes, the temperature of which rarely exceeds from 120 degs. to 130 degs., the larger proportion of the heat acts to warm the air of the room, and the air warms the walls and furniture.

But when stoves or pipes are heated to a high temperature, the heat is partly communicated to the adjacent air, and partly acts as radiant heat to warm the surface adjacent.

This will be best explained by imagining a stove-pipe heated at the end nearest the stove to a dull red heat of 1,230 deg. Fahrenheit, and of sufficient length to allow the heat to be diminished to 150 deg. at the further end.

It would then be found that at the stove-end of the flue-pipe, 92 per cent. of the whole heat emitted by the pipe is given out by radiation to the walls, and only 8 per cent. to the air; but at the exit end the heat is nearly equally divided, the walls receiving 55 and the air 45 per cent.

Taking the whole length of such a pipe, the walls would receive 74 per cent. and the air 26 per cent. of the heat emitted.

With flue pipes heated to lower temperatures the air would receive more than half the heat.

When, therefore, the object is to heat the walls of the room, rather than the air, the temperature of the pipes should be high.

For instance, with the Perkins system of small pipes and closed circulation, the temperature of the pipes varies from 150 deg. to 250 deg. or even 300 deg. With these more than half the heat would be radiated to the walls.

Thus the character of the heat which we

desire to obtain must decide the form of heating and the temperature to be maintained.

To ensure comfort it is essential to combine warmth in the walls and floors with cool air to breathe—as, for instance, air at a temperature of 54 deg. to 64 deg.

*Effect of artificial light on purity of air.*

Every form of matter, when sufficiently heated, has the power of emitting rays of light, and thus becomes self-luminous.

This condition is termed incandescence.

All artificial sources of light depend upon the development of light during incandescence. For the purposes of lighting our streets and houses we have hitherto chiefly made use of a combustible gaseous combination of carbon and hydrogen which forms the chief constituent of ordinary coal gas. When this hydro-carbon burns, that is to say when its elements unite with the oxygen of the air, it undergoes partial decomposition, the hydrogen unites with the oxygen, and forms water, and heat is evolved. The carbon is separated in the solid state, and floats in a finely divided and incandescent state in the interior of the burning vapour, and this constitutes the flame. The presence of the particles of carbon may be easily shown by holding any non-combustible body in the flame, when the carbon, in fine powder, will be deposited upon it, forming a layer of soot, or what we generally term lamp-black. The combustion of the particles of carbon takes place at the border of the flame, where they are first brought into contact with the oxygen of the air, when these substances unite and form carbonic acid; but if the supply of oxygen to them be insufficient in quantity they partly go to form carbonic oxide, which is a highly deleterious gas. Moreover, a portion escapes into the air of the room as solid particles, the result of which is that the flame is said to smoke.

The brightness of the flame is owing to these solid incandescent particles. The burning gas itself possesses only a feeble illuminating power.

The Bunsen burner gives a smokeless and non-luminous flame. In the Bunsen burner ordinary gas is conducted into the tube of the burner, but at the same place air enters, and mixes itself with the gas in the interior of the tube; and thus oxygen is admitted, not only to the border of the flame, but throughout its whole mass, and the carbon is accordingly burnt into carbonic acid before it can separate in the solid form, so that the flame is composed of incandescent gases alone, and gives a very feeble light, and deposits no soot or bodies held in it.

In consequence of the more perfect combustion that takes place, it is used as a heat-producing flame. If a solid body be introduced into this feebly luminous flame, such, for instance, as a piece of platinum wire, the incandescent metal glows with a brilliant light; and this fact has been utilised to produce the Welsbach and other similar forms of incandescent light.

The flames of candles and lamps, whether the substance burnt be tallow or wax, rape or petroleum, do not differ essentially from those of an ordinary gas-burner. The same hydro-carbon gas, which is the essential constituent of common gas, is the source of light in them.

The hot wick, which draws up the fluid material about to be burnt, plays the part of a small gas factory, the produce of which is used on the spot, the only difference being that coal-gas is always purified before it is consumed, whereas the extemporaneous gas of a candle or lamp is consumed without being purified at all; on the other hand, the tallow, wax, and oil contain the carbon and hydrogen in a purer and more concentrated form than the coal from which ordinary coal-gas is made.

The flames of candles and of lamps all owe their luminosity to the incandescence of particles of carbon floating in them; and the reason why one description of candle or lamp is more smoky than another is because the supply of air

in the smoky one is not sufficient to produce adequate combustion.

From this it is obvious that in order to obtain the highest illuminating power of a flame in which hydro-carbonaceous compounds are undergoing combustion the regulation of the supply of air is essential. This more perfect combustion is also essential to the maintenance of the purity of the air of the room.

In a hygienic aspect, it is also essential that the compounds used to produce light should be as pure as possible, and during the last twenty years vast improvements have taken place in the methods of purifying gas, so that now the London gas is almost entirely free from sulphur and its compounds.

The effect caused on the air of a room by combustion is (1st) to diminish the oxygen, and (2nd) to increase the carbonic acid and to produce water and ammonia. If the combustion is imperfect, the effect is also to create carbonic oxide and soot, as well as to disperse into the room any impurities which the material which is used for illumination contains besides the carbon and hydrogen which are necessary for purposes of illumination.

The standard which has been adopted for light is that of a No. 6 sperm candle burning 120 grains per hour.

The effect of the combustion of the different materials employed for purposes of illumination upon the air of a room in producing one candle power are as follows :—

	Quantity Consumed.	Carbonic acid produced.	Water Vapour.	Unity of Heat.
Tallow ...	Grains. 154	Cubic feet. .51	lb. .023	97
Sperm ...	120	.41	.020	79
Oil ...	91	.33	.018	72
Gas— Cubic feet	56	.40	.025	121

Thus you will see that oil gives the light with the least injurious effect on the air of a room, and that for the same amount of light, gas throws out the largest amount of impurity in the air and also produces the largest amount of heat.

Independently of this the hygienic conditions in the burning of gas differ somewhat from those in the case of candles.

The gas comes from a street main, in which the pressure is constantly varying, partly in consequence of the continual variation which takes place in the number of lights in use.

For instance, if a large shop suddenly lights up its establishment, a sudden decrease of pressure would occur in the neighbouring houses. In order to obtain sufficient light in a neighbouring house it might be necessary to turn the cock of the burners full on. When the lights in the shop were extinguished the pressure would be suddenly increased, and the gas would be forced through the burners more rapidly than it could be consumed. Consequently much impurity might be forced into the house in the shape of unconsumed gas, unless the pressure at which the gas reaches the burner is regulated.

It may, however, be assumed for purposes of ventilation that each candle or gas-light burning 4 or 5 cubic feet of gas per hour will consume as much air as a man.

The electric incandescent light, formed by a thread of carbon, rendered incandescent by means of an electric current, and contained in a close vessel out of any contact with the atmosphere, can in no way vitiate the air of a room, and is in fact the most hygienic form of light which can be imagined.

On the other hand the arc electric light, which is not contained in a closed vessel, may be injurious to health in an occupied space because of the nitric acid developed.

## PATENT MEDICINES. No. 4.

## MORE ABOUT MATTEI'S ELECTRICAL REMEDIES.—DU BARRY'S REVALENTA ARABICA FOOD.

IF matters go on as they have done lately we shall before long stand in need of the tiny toy revolver and the trusty Andrea Ferrara blade, with which Mr. Stead so picturesquely furnished Count Mattei's bedroom. Letters reach us of an abusive character, invariably without real signature, or with such vague signatures as "Indignant" and the like; while one correspondent goes so far as to suggest that we are directly interested in promoting the increase of cancer, "the which"—as Madame, for the writing is that of a lady, angrily and ungrammatically puts it—"is, as *you* must know, greatly on the develop in this country." "On the develop" is somewhat original, and savours strongly of American-English, although the post-mark is "London, S.W." Yes, Madame, we do know that cancer figures much more frequently in the Registrar-General's returns than it formerly did, partly, perhaps, because medical men are more skilled in diagnosis; but while admitting this fact, we must decline to admit that Mattei's Electric Remedies are anything but the sheerest humbug.

*Populus vult decipi*, says the ancient proverb, and a certain section of humanity seems determined to render the axiom as truthful as when it was first uttered. Such people like to be deceived, with apparently as much persistency as Dogberry, in Shakespeare's "Much Ado About Nothing," desired to be written down "an ass;" yet when we write them down as of the same character as the simple-minded quadruped, they are not contented.

We would not, however, let it be supposed that all the correspondence which these articles on quack medicines have brought about is of so disagreeable and unattractive a nature. On the contrary, we have received letters from men occupying high social status

and of universally recognised scientific attainments, expressing their cordial approval of the position we have taken up, and encouraging us to proceed with our task. Some of these gentlemen have also favoured us with valuable suggestions and remarks. *Apropos* of Mr. Stead's eulogistic description of Mattei, published in the January number of the *Review of Reviews*, a prominent member of several learned societies writes: "I noticed that Mr. Stead, in the account of his visit to Mattei, does not mention that he saw any apparatus or other evidence of an extensive manufacture going on, such as stills, pipes, vats, and other kinds of plant. All of this kind that he says he saw (at the headquarters at Bologna) were carboys, full or ready to be filled with liquid. If there were any real manufacture it would be impossible that some traces of it should not be visible. But" (adds our correspondent, doubtless referring to the fact that the electricities examined by Mr. Stokes, whose analysis we have published, turned out to be fine specimens of *aqua pura*) "if the carboys had merely to be filled at a tap, then Mr. Stead saw just what was necessary to the purpose."

This correspondent has hit upon one of the weakest points in Mr. Stead's narrative. When at the headquarters at Bologna he was told by Mattei's nephew, the manager, that "a million phials of the little granules, and about as many bottles of the electricities and boxes of ointment" were sent out every year. Two millions of bottles and boxes! Such enormous figures must surely have set Mr. Stead in a state of anxiety to witness the manufacture of the preparations with which these bottles and boxes were filled. Not so, however. On the following day he was taken to see "the hermit Count in the secluded retreat which he has built in the mountains." He could not have expected to find any factory there, for he has already told his readers that "the Count does no business." If he had done, Mr. Stead

would certainly have noticed some signs of it. He describes the residence at Riola so minutely that even a comic paper, lying on the settee of one of the rooms, failed to escape his vigilance. There was much pleasant conversation between the Count and his English visitor, the advantage even in this respect being manifestly on the side of the Count, who "talked of his remedies with an almost childish eagerness." Against time, apparently, and though every room was carefully exhibited, every nook and corner investigated, Mr. Stead was "not admitted to the secret laboratory where this Wizard of the Hills works his wonders," and after a splendid luncheon, at which Mattei did not condescend to be present, he took his leave of "the Pope of Health," and was soon speeding back to Bologna and thence by express home again, to publish a challenge to the Faculty in the *Review of Reviews*—otherwise a monster advertisement of Mattei.

The Mattei Company, Limited (to the extent only of the credulity of the Count's supporters) has not yet "boomed," but a portent of its becoming imminent has appeared in the shape of an announcement lately in the newspapers, to the effect that the manager of the Mattei new dépôt in London regrets his inability to supply customers with sufficient rapidity. Happy thought! Why not adopt the idea evidently passing through our learned correspondent's mind when he penned the letter from which we have given an extract, and manufacture the remedies in England? The carriage from Italy of many carboys full of liquid must be expensive.

Our speaking of monster advertisements just now reminded us of one which took up the greater part of a page in a London daily paper a short time ago, setting forth the marvellous curative virtues of Revalenta Arabica. From asthma down to vertigo, no disease has ever been known to resist this wonderful remedial agent, according to the published specimens of the

100,000 (we hope our compositors will be careful with the noughts—there are plenty of them) testimonials of cures which the proprietors profess to have in their possession. Besides, these testimonials are many of them quite respectable by reason of their age, bearing such dates, for instance, as 1850, 1852, and the like, while some may be even older, for they have no date at all. And such people of rank, too!—for example, a Marchioness de Bréhan, of Versailles, whose cure is numbered 58,614, felt so "dreadfully low-spirited" that even the voice of her maid annoyed her. There is no novelty in ladies being annoyed at the voices of their maids, particularly if the latter should "give it them back again," as they would say, when subsequently describing the incident in the servants' hall. However, the poor marchioness must have been in a very bad way, for she asserts that "many medical men, English as well as French, had prescribed in vain." The last three words remind us of the doggerel epitaph, "Affliction sore long time I bore, physicians were in vain," &c. It rather puzzles us, as the marchioness has not thrown any light upon the matter, to make out how she contrived to consult so many English physicians at Versailles, but that is only a detail, which one loses sight of in rejoicing that she not only recovered her health, but was able to resume her social position. How nice! and how thoughtful of Du Barry and Co. to give us the cases of such interesting people, instead of vulgar, common paupers like the one who is said to have cured a hole in his leg by taking Clarke's Blood Mixture. Looking at the matter from a business point of view, too, it costs no more to advertise a marchioness's testimonial than a pauper's. So our advice to quacks is: Stick to the people of title, and let the paupers go to the—workhouse.

"A fool and his money are soon parted," as our readers will presently see—not that we consider ourselves the fool, having a special

reason for the purchase. We invested two shillings in a half-pound packet of Du Barry's Revalenta Arabica at a chemist's shop in the Strand, being particular about its being Du Barry's, as the manufacturers of this article have issued a caution against cheap foods. Two shillings for a half-pound cannot be said to be cheap, when we state that it must have cost the manufacturers probably a penny, or even more, as we will show directly.

On the next day we forwarded our purchase to an eminent analyst. We will let him take up the story for a while, for we must confess that the following report nearly took away our breath :—

"Analytical Laboratory,  
Vestry Hall, Paddington Green, W.,  
February 14th, 1891.

Dear Sir,—On February 10th I received from you a half-pound tin of "Du Barry's Revalenta Arabica Food." This was enclosed in unopened wrappers. I have now made a careful chemical and microscopical examination of the material.

I am of opinion that it consists solely of lentils ground up into a fine powder. I could detect no added ingredient possessing any medicinal or other properties.—I remain, yours faithfully,

ALF. W. STOKES, F.C.S., F.I.C.,  
Public Analyst.

To the Editor of HYGIENE."

With this report Mr. Stokes returned to us the wrappers and copy of testimonials which they had contained. The testimonials were, as far as we took the trouble to ascertain, similar to those which had attracted our attention in the newspaper advertisement; and there was the same lengthy list of diseases for which, to use Du Barry and Co.'s own words, "this delicious food is the *only* cure." We have put the word "only" in italics, because we never before heard of lentils being the only cure for consumption, deafness, diabetes, dropsy, paralysis, &c. On the wrapper is given a small woodcut of a number of black men, very scantily clad (they look as if Revalenta had almost cured them of clothing), presumably engaged in cultivating lentils, with the words printed underneath :—"Discovered, exclusively grown, and imported by Du Barry and Co."

If Du Barry and Co. discovered lentils their firm is, indeed, of long standing, seeing that this leguminous plant was well known to the Hebrews and other ancient nations. As to Du Barry and Co.'s exclusively growing lentils, we should be glad to learn where they accomplish this extraordinary feat, and why lentils can be bought at any corn-chandler's shop for about twopence the pound, at which rate "lentils ground up into a fine powder" (*vide* Mr. Stokes' report) can be purchased in bulk at Mark Lane.

"In the name of the Prophet, figs," was the cry of the itinerant fruit-seller in the old Eastern tale. "In the name of the *profit*, lentils," is the new reading suggested by Du Barry's Revalenta.

THE EDITOR.

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## BRITISH HEALTH RESORTS.\*—No. 11.

### BOURNEMOUTH.

BY THE REV. R. AUGUSTINE CHUDLEIGH, M.A.

BOURNEMOUTH has been said to have the mildest climate and the fiercest population of all the southern coast. That is not true. The climate is not so mild as that of Penzance or Falmouth, and the ferocity of its inhabitants has been considerably overstated. Geologists assure us that the antecedents of Bournemouth were undeniably warm, and the meteorologists declare that its present climate maintains as much as can be expected of its ancient high-

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\* The object of this series is to direct attention to the merits of different British Health Resorts, too often overlooked and neglected by persons who are put to much expense, trouble and loss of time, in visiting Continental Spas, instead of availing themselves of facilities open to them in their own country. No. 1, Hastings and St. Leonards; No. 2, Cornwall; No. 3, Droitwich and its Brine Baths; No. 4, Swanage; No. 5, Isle of Man; No. 6, Lowestoft; No. 7, Llandrindod; No. 8, Rostrevor; No. 9, Cromer and Yarmouth (Norfolk), and Rye and Camber (Sussex); No. 10, Brighton. Any single number can be had post free by remitting seven stamps.

temperature traditions; for the tale of the strata below the topmost stratum which at present overlies the rest, consists of a busy mass of human drift which forty years of fashion's tide has been depositing around the mouth of that tiny burn which here struggles through the sand to the sea. It is said—but it is probably a malicious libel—that this burnmouth was at one time an earthenware drain pipe (and not many inches in diameter!) but at present the stream disappears into the earth on the landward side of the Pier road. Whither it goes, or where it reappears, let no one be so profane as to inquire. That stratum of humanity, like the strata beneath its feet, is worth a little study. Its characteristic is diversity.

Bournemouth seems the chosen home of every class and of every creed. Under its salubrious skies one sees the survival of the fittest and the least fit side by side. Gallant officers of both services—retired, of course—dyspeptic and pale clergymen, returned Indians, with hepatic troubles writ large on their sun-dried faces, seem to find life more tolerable here than elsewhere. *Omne quod exit* in “ism,” and *omne quod exit* in “opathy” can manage to exist. All religions and all diseases have their temples here, so that the sick in body and the sick in soul can enjoy unhindered their favourite cure. If there be somewhat combustible materials, and if, under the inflammatory influences of politics, religion, and temperance, they do occasionally catch fire, there is, of course, an opportunity for a little chaff about ferocious populations. Yet, for all that, there are few places where religion is more real, or property more safe, where the churches are more beautiful, or the congregations more earnest, than at the so-called Hampshire Torquay. Why that name was given to Bournemouth is possibly known to those that gave it. The two places are not alike. The character of its fences is often a clue to the general character of the place. Now Torquay abounds in limestone, and a mere boundary wall will often make one

stop and admire it as an example of good and solid masonry. Bournemouth, on the contrary, is badly off for stone, but abounds in sand, mostly silicious; and the crumbling fences of sandy turf generally strike the new-comer as one of the peculiarities of Bournemouth. Perhaps it is not too much to say that the chief interest and importance of the locality (*absit omen*) is founded upon its sand. The dryness of its soil, the salubrity of its air, the interest of its geology, the peculiarity of its scenery, its flora, and that famous children's playground—its miles of soft beach, cannot be explained or described without using the word sand with exceeding frequency.

Bournemouth lies in the Hampshire basin, the westernmost of the three great Eocene depressions, which contain between them the best geology and the largest cities in the whole world. If one alights at the East Station and walks straight out to the East Cliff, the idea suggests itself that one is at the broken edge of a huge basin—that a large fragment has been broken off, or cracked out and washed away. At one's feet is a loose sandy cliff, the face of which is perpetually slipping and sliding downwards into the sea. It is not at all like the cliffs at Land's End, which look as if they have never altered since creation's dawn, and will remain unchanged till the final doom. It is not like the slates and schists of the Newquay coast, which look as if they were broken off fresh last night, and will lose their freshness by to-morrow morning. The Bournemouth cliffs more resemble a railway cutting, or rather, an embankment, not made *quite* recently, but channelled and gullied by a few years of frost and rain. What mean all these waterworn pebbles and seaborne sands, and whence did they come? The geologist replies, and did he not give good reasons for his strange answer we would not for one moment believe him; he declares that we are right upon the spot where the grandest of ancient rivers met the warm primæval sea. He tells of a vast continent which once

stretched in continuous line across the Atlantic Ocean, though now Greenland, Iceland, the islands around Scotland, and the granite hills of Cornwall, are the only portions left above the waves. He tells us that the memory of this great continent still lives, not only in traditions of Atlantis and the Hesperides, but that certain migratory birds still select a line of flight which coincides with the ancient coastline, as if impelled by transmitted habit to attempt an ocean flight which grew gradually longer as the vanished continent sank beneath the waves. In consequence of this great barrier, the cold Arctic current could never chill the southern seas; while, on the other hand, the great Atlantic current would be curled round far more than now, and would pour its warm waters right into the estuary of the river which flowed down eastward from the Atlantis continent, with the result that just where Bournemouth now lies, there would be deposited vast beds of shingle, sand, gravel, and clay, in which would be found the fauna and flora of a continent and an ocean, of a fresh-water river and a salt sea. Time would fail to tell of the ice age which followed, or of the chalk barrier which in comparatively recent times joined the chalk of the Needles with the corresponding formation in Purbeck, near Swanage, just across the bay; how the sea and the land springs combine to erode the cliff—the land-springs, by forming an under-cliff, as at Ventnor, the sea by promptly washing that under-cliff away; how full five miles of land has thus been removed—all this should be learnt on the spot by those who seek health, and health will assuredly be found in this process of seeking.

And Bournemouth has charms for others than the geologist. The botanist has a chance of finding many a prize. *Simethis bicolor*, found nowhere else in England, was found at Bournemouth as lately as 1855. And though an organised search revealed only semi-detached villa residences, eligible, of course, on the home where *Simethis* grew, yet it is whispered that

some know its retreat in Branksome Woods even now, and they do not mean to tell—and they are quite right too. It is also said that *Diotis maritima* is occasionally seen on the tongue of land between the Avon and the Stour. *Garduus mariamus* is within reach; at least, there is a field where it regularly appears once every four years. It is the rotation of farm crops which, by giving it a chance of growing, effects this periodicity. We know a bed, scarcely larger than a tablecloth, where *Cicendia filiformis* grows so thick that we once enclosed twenty-five flowers in one pinch of the finger and thumb. We found also a plant of *Centaurea solstitialis* with about three hundred buds on it of which only four expanded, as it had to be transplanted to save it from the scythe.

And Bournemouth is now incorporated and excellently governed with a right noble mayor in Mr. Hankinson, of more than local fame. And there is talk of British Medical Association gatherings and British Association meetings to make her still more popular; and of municipal buildings and marine roads, and new piers, and more churches, and still more concourse of gay and busy people. And she is getting known for her great writers and illustrious thinkers, or, rather, for affording shelter to many whom any great city would delight to honour. Nor is she without her own native talent, bred and developed within her fostering bosom; and in proof of this I may mention "Oysters, and all about Them," the *opus magnum* of Dr. J. R. Philpots, who has spent half-a-dozen years and vast sums on the two huge volumes, which present the place in a new light to the world.

Then the neighbourhood is worthy of the place; and among the objects of interest there is Wimborne Minster and the Priory Church at Christchurch; there is the New Forest and Corfe Castle; there are the accumulated delights on the earth and in it of ten centuries and (say) ten billion years. The pier, the gardens, the clubs, and the trains leave little to be desired. There are books

published about Bournemouth as a health resort, and, like the place itself, they are quite healthy and very dry; but they tell one the analysis of the water, worked out to three places of decimals, and the curves of temperature to the tenth of a degree. They tell for what diseases Bournemouth is indicated and contra-indicated, and much else which is useful to know, which is not found in this article; for this article strives to describe, not Bournemouth in a book, but Bournemouth out of book—how she felt, and looked, and pleased, as one roamed through her pines, was blown about her breezes, got her sand in one's eyes, and personally made her acquaintance.

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### SHORT HEALTH-PAPERS.

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By DR. ALFRED J. H. CRESPI, WIMBORNE.  
(Formerly Editor of the *Sanitary Review*.)

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#### No. I.

THE science of health has two main objects: one—and the more important—to teach man to keep himself, mind and body, in vigour, so that he should be in the best possible condition for doing the work of life; the other—easier and less important—to remove the causes producing and aggravating sudden and fatal outbreaks of epidemic diseases. The former includes many matters not generally supposed to come within the province of the sanitarian; it comprises training the bodily powers in childhood, and in more advanced life the formation of habits of industry and temperance, and the avoidance of defective hygienic conditions, so that it includes many subjects to which the term education is generally applied. But whether education is part of sanitary science or not, there is no question that it must be based on a knowledge of the latter, for, from the intimate union of mind and body, no system of mental training is scientific which does not take into account the development and preservation of

the physical powers. In its broadest application, sanitary science applied to purposes of education, made practically useful in short, includes everything having as its object the preparation of man for the great work of life, the preservation of his powers in the highest efficiency, the enabling him, during a long life, to work easily and successfully so that he should not break down, mentally or physically, until he has borne the heat and burden of the day. Under the second head, the prevention of epidemic diseases—if that, indeed, be not part of the former—are comprised those measures, such as good drainage and an abundant supply of pure water, which diminish the danger of fevers and of all infectious and epidemic complaints.

Under the most perfect hygienic conditions, man will always be liable to many painful and fatal diseases, some due to unavoidable exposure to noxious gases or inclement weather, others to premature decay. Circumstances may occasionally arise compelling him to face the causes of disease, and when, as sometimes happens, duty spurs him on, the danger must be calmly and bravely met; but this cannot often be the case, and far more often the danger might be avoided. At best, sanitary science only hopes to avert those diseases which interfere with the work of life during those years when life should be a pleasure. The gradual and painless decay of the mental and physical powers must come at last, but it need not be dreaded as an evil if it comes after the heat and burden of a long day have been bravely borne. At present, death from decay of nature—in other words, from old age—is very rare, and even a busy doctor may not see two cases in a year.

#### No. II.

However weary the world may get of the subject of health, its importance must be insisted upon until it is generally admitted. It is sheer folly to expect a few bottles of medicine to produce lasting benefit on any constitution

as long as the complaint for which they are taken depends on important changes of the vital organs. But these changes, caused originally by long-continued exposure to unfavourable hygienic conditions, become at last irremediable, and no power on earth can undo what has taken place. For example, it may be wearisome to be warned that rheumatism will some day punish neglect of the laws of health, but the day at last comes when unnecessary exposure to the causes of rheumatism brings on an attack. Of course the patient's friends fly for the doctor, and with zeal, sometimes untempered by discretion, the latter prescribes large quantities of various preparations of alkalies, and the patient finally recovers, at least he and his doctor give it this name; but a change in his constitution has taken place, and even under the most favourable circumstances he is henceforth peculiarly liable to another attack. A little exposure, which before his first attack would have been attended with no bad consequences, may bring on a relapse; nay, a trifling change of weather may occasion severe pains in his joints, and the older he gets the worse he becomes. This, remember, is the case when rheumatism terminates favourably. Suppose it terminates unfavourably; but although the first attack does not kill outright, what follows? The action of the heart is impaired, and permanent disease set up. No medicines have any power to retard the progress of the fatal changes which then go on, slowly at first, but with ever-accelerating rapidity. At last, though perhaps not for years—years of suffering and weakness, mind—death comes. In the pathetic words of the sufferer and his friends, he has never been the same man since he had that first attack of rheumatism. Of course not, for a change has come over his body, though he knew it not, and that change goes on increasing till he finds rest in the grave. If poor, he hopes that the warm weather, the dry weather, or the cold weather may do him good. If rich, he goes full of hope to Bath, to Harrogate, or

somewhere else, where he has been told that he is sure to be cured. Change does him good for a time, then he slowly sinks lower than before. Would not care in the first place have been better than anything that could be attempted after the victim had been seized by a tyrant who may relax, but never yields up, his terrible hold? Yet the poor people who smile at prevention as foolish think no expense thrown away the object of which is that impossibility—a complete cure.

### No. III.

The really wise physician can follow with attentive eye every step a disease takes. But how seldom can he successfully interfere! How often rather are the resources of his uncertain art useless! Occasionally drugs are of service, but only when given to cut short some of the effects of exposure to the causes of disease. But for drugs to benefit it is a *sine qua non* that those effects should be such that, left alone, they would, as it were, wear themselves out. In other words, drugs accelerate recovery in cases in which the restorative hand of Nature would more slowly cure the sufferer. Medicine is practically powerless when the effects of disease would be left to themselves, permanent. Medicine can do nothing when disease is slowly changing the textures of the body, and giving rise to pain and disorganisation where normally should reign health and strength. Is not surgery more powerful, some will ask, who, sceptical of the powers of the physician, think that the surgeon can achieve much? No, it is not. Surgery is successful when summoned to Nature's assistance and working as Nature works. Surgery may cure an aneurism, but only when that aneurism is in the best possible condition for undergoing a spontaneous cure. Surgery may remove, quickly and painlessly, a gangrenous limb, but, if the sufferer's strength lasted, Nature would herself cut off that limb. Surgery will take out dead pieces of bone; she will open

abscesses, or remove tumours, and her triumphs are brilliant; but only when she does what Nature tries to do, what Nature more slowly, more painfully, sometimes accomplishes. Scientific surgery and medicine help Nature; they are her handmaidens: they enable her to triumph when she would fail left alone. It may not seem much to do, but ten thousand failures warn them not to attempt what they cannot accomplish. They cannot force Nature, and therefore they can seldom arrest disease, or permanently relieve suffering.

It is not a question of large or small doses of drugs, nor one of skill and knowledge on the part of the medical attendant. The large doses of the allopathist are not less worthless than the small ones of the homœopathist in nine cases out of ten. When there is most need of assistance the physician, who has learnt the mysteries of his art, can only lament that, while health was unimpaired, it was not preserved as the greatest of treasures—a treasure which, once lost, can seldom be restored. The impotency of medicine conveys a lesson to those who choose to learn it; it is—Study to preserve that which, if endangered, may pass for ever beyond recall.

#### No. IV.

Few are aware how easily some of the blessings, which careful attention to and patient study of the laws of health confer, can be brought within the reach of all. Better days are coming. Before long some fruit will reward the untiring and disinterested labours of hundreds of medical and scientific men, who are earnestly at work trying to prevent what can seldom be cured. Were curative medicine a strong and sure defence, it would still be easier to prevent suffering than to call in the resources of the physician's art to restore health, which ought never to have been endangered. But since curative measures are uncertain, and often disappoint those who put their trust in them, it is ten times more important to fall back on the

assistance of that noblest branch of medicine, which has boundless power for good. In the splendid triumphs of preventive medicine is seen the promise of what the future will bring forth. The lessened mortality and the longer and healthier lives—the privilege of some classes at the present day—are proofs that those are not dreamers who permit themselves to hope that in a couple of centuries there will be a marked diminution in the amount of sickness, and that the duration of the working period of life will be materially lengthened. In that brighter future death will oftener come as the result of a gradual decay of the physical powers, and men and women will enjoy a more vigorous life and a more peaceful and happy old age. Do not these rewards vindicate attention to the wonderful science of health?

#### No. V.

Briefly to recapitulate: these short papers have not answered the object I had in writing them if they have not drawn the attention of the reader to the following important facts: that it is far easier to prevent than to cure; that curative medicine—understanding by that term medicine and surgery—is usually powerless for good, except in cases when Nature would have sufficed, if not to ensure recovery, at least to place the sufferer on the high road to recovery; that sanitary science, in its broadest and most scientific interpretation, deals with the training of the mind as well as of the body; or in other words, that no system of education deserves the name, which does not concern itself with the body as well as the mind; that the prospects of sanitary science are brilliant; and, lastly, that some knowledge of the science is indispensable to every man who takes upon himself the charge of a family. It is not difficult to learn something of the structure of the body, its functions and its dependence on the mind; but that knowledge must be practical, not theoretical. In all cases in which this knowledge is reliable, and influences national

manners and customs, the standard of health rises: as it rises, the average time during which men and women are able to exert themselves strenuously and happily extends. Let all who have the charge of children or workpeople, all whose opinions and example influence others, hasten on the advent of the time when, in a sense never yet realised, man will live naturally, painlessly, and successfully.

### GYMNASICS FOR GIRLS.

“GYMNASICS for girls! What an absurd idea! What next!” and so on, would probaby have been the reception accorded to such an article as the present one as recently as fifteen or twenty years ago. *Mais nous avons changé tout cela*, and nowadays both our girls themselves and their mothers also are rapidly becoming aware of the fact that physical culture and exercise is quite as important a factor in their own well-being as it is in that of their brothers and sons.

Many difficulties have had to be surmounted in this matter of physical culture for girls. Amongst others the disinclination on the part of the girls themselves to take systematic exercise, or undergo unusual, and what may be fairly classed as somewhat novel experiences. Then there has been Mrs. Grundy to reckon with, and, if instructors may be believed, fashion has also been a great deterrent. One young lady (a new pupil) at a London gymnasium recently appeared in her gymnasium dress with a tightly-laced and trimly-belted figure, and said to the lady instructress, when remonstrated with, “I couldn’t think of spoiling my figure.” It is needless to say that corsets had to be taken off, and she is now one of the neatest, as well as being one of the most graceful members of the large class she attends.

The belief that the purposes of development in the case of girls was fully and satisfactorily served by the coarse of “backboard” piano-

playing, novel reading and fancy-work, and that the daily walk, drive, or ride, was sufficient exercise, has died hard. Absurd suppositions die hardest, and centuries of neglect of their physical needs served to make the girls themselves suspicious, and undesirous of change. Games and gymnastic exercises were often associated in their minds with roughness, and inherited ideas of the unfitness of the sex for such things made girls chary of committing themselves to anything “tom-boyish,” or unladylike.

Now, however, happily the barriers to progress in this direction are being rapidly surmounted, and broader ideas of this question of physical culture for girls are becoming more general. There are few now of our large towns which do not boast a gymnasium, and not many public gymnasias are without their ladies’ and girls’ classes.

With the ideas of the most advanced “dress reformers” we may not be able to agree *in toto*, but to all who urge the necessity and duty of granting to girls equal freedom with boys to cultivate their physical as well as their mental capacities, we owe a debt of gratitude, for, as it has been truly said, “when you educate a boy you perhaps educate a man, *but when you educate a girl you lay the foundation for the education of a family.*”

There are still left a few mothers who place the importance of possessing a “figure” before all considerations of health; and tight-lacing, especially amongst the upper middle class, is still too rife by far, but we hope the time will soon come when even fashionable mothers will cease to “set up” their daughters’ figures with corset and stay; and will, instead, by encouraging every healthy and reasonable form of exercise and culture, seek to minimise the risks of motherhood, and thus help to lay the foundation of an improved standard of national physique and health.

One of the objections often urged against girls attending gymnasias is the one that, by so-

doing, they will become unladylike. Nothing could be more absurd. We have quite recently been present at one of the largest gymnasias in London, witnessing one of the young ladies' classes, and no one could say that a single member of the class—which numbered sixty girls, ranging in age from twelve to nineteen or twenty—showed that the training she had undergone had proved in the least degree detrimental either to her femininity or manners. But to the contrary. Of the good and improvement wrought in the physique, movements, and manners of girls who attend the classes in the poorer districts of London and our large towns—many of which classes are in connection with the National Physical Recreation Society—there is ample and convincing proof forthcoming for those who wish it.

The objection that some mothers make on the score of their girls not being strong enough is easily disposed of. For that point may safely be left to the instructor for decision, *unless some special physical weakness is known or suspected*, in which case, of course, a properly-qualified medical man should always be consulted. In most gymnasias there are special classes for such pupils as are delicate or unable to perform and go through the usual exercises and drill, so that even the most delicate of girls may hope to strengthen and build up her constitution by properly adapted gymnastics.

Physical culture can scarcely be commenced too early, and it is quite certain that most girls of seven might be with advantage sent to a children's class. A girl will be far better fitted to tide over the "dangerous age" who has by physical culture obtained a sound constitution, than one who has been thrown back on fancy work and sensational literature as a last resource. Juvenal's "*mens sana in corpore sano*" is a capital axiom for girls as well as boys.

Of course girls are not able to do some of the gymnasium work which comes quite easy—after practice—to their brothers; but most of that from which they are debarred is of the

less useful and more showy kind. In the gymnasium to which we have already referred both ladies and girls are instructed (in addition to the usual bar bell, dumb bell, and Indian club exercises and drills) in the parallel and horizontal bars, vaulting horse, giant's stride, climbing (poles, ropes, and ladders), trapeze, swings, and rings, besides the "rowing" and other similar appliances, so that they have little of which to complain. The only things of importance, indeed, they are not permitted, which their brothers are, is weight-lifting and some of the more intricate and risky of the "show" exercises. Fencing is a most graceful form of exercise, and one indeed which has much to recommend it, and this is being taught to many ladies and girls—in London gymnasias at least.

As to the fitness of girls for gymnastic training and exercises we have no reason to doubt; but the following opinion from a gentleman who has one of the most complete and largest gymnasias in England will, we think, convince the most unwilling and sceptical.

He says in a letter to us:—"As far as my experience, extending over a period of thirty years, goes, I find boys the most difficult to teach, and their physique is not equal to that of girls. This latter fact may, however, be somewhat accounted for, as I fancy boys are often only sent to a gymnasium when delicate or unfitted for out-door sports. Girls are naturally more quick and forward than boys, particularly at the ages between seven and fifteen. They are very attentive, and when once they begin coming to a gymnasium I have found they never lose a lesson if they can possibly help it. With them the very best results are produced, and I have found, generally speaking, that even in the case of delicate girls they are stronger and possess more endurance than boys."

Another lady, speaking of the same subject, said, in answer to our questions, "Oh, dear, yes! So far as my experience goes, girls are quite as able to perform all the ordinary and, indeed,

many of the special exercises as boys, and at any rate they are far quicker in picking up things, and are of course more graceful.

“Yes! Fashion has had a good deal to do with keeping girls from physical culture. But nowadays it is becoming almost ‘the thing’ to go to a gymnasium, and we shall in time hope to change all unhealthy forms of dress. Fashionable dress has had a good deal to answer for. For instance, a young lady of seventeen came to one of my classes about two years ago with her waist laced scandalously tight—to seventeen inches. Well, she attends now, and her *physique* is wonderfully improved, although her waist will of course never be the size nature intended, twenty-four to twenty-six inches.”

“How large is it now?”

“Very little more than twenty inches, and it will never be very much larger. She regrets her folly now—she was saying so to me only the other day—but her mother seems to have encouraged her in it.”

One of not the least important advantages accruing from two or three hours spent weekly in the gymnasium is the mental relief which is experienced. Any girl who attends a gymnasium will endorse fully the opinion of a young lady at —’s Gymnasium, who said: “Do I like gymnastics? I should think so, if only for the freedom I get from petticoats and tight stays.”

The matter of a suitable dress is a point of some importance, as it should be as light (in weight) and as little cumbersome as possible. We append a full description (kindly furnished to us by one of the lady instructresses) of the costume worn in one of the chief of the London gymnasias:—“A loose tunic (with collar) reaching to within three or four inches of the knees: longer is not advisable, as anything approaching the nature of skirts sadly interferes with freedom of movement; a knitted cardinal worsted or silk girdle for the waist; knickerbockers, made full and gathered into an elastic band just below

the knee; dark blue or cardinal stockings; and white gymnasium shoes. The above dress is most suitable and serviceable if made in navy blue flannel or serge, with facings of cardinal if desired. The only under-garment which should be worn, or that is indeed required in most cases, is an *all wool or merino* combination; garters or suspenders are not necessary, the elastic band of the knickers being all that is required. Corsets should of course on no account be worn, but if a girl be of a stout, full figure it would be more comfortable for her to wear a well-made, close-fitting corded bodice, which will prove to be quite sufficient support.”

Most large gymnasias strive to have their own uniform or dress, which differs slightly from that described in the matter of ornamentation and the length of the skirt or blouse worn, but in little else, the skirt being generally worn longer, *i.e.*, nearly reaching to the knees, where the instruction is chiefly confined to Swedish drill or to Ling’s system of physical exercises, whilst, in the cases where instruction is given with the more complicated kinds of apparatus the blouse or skirt is quite short, just covering the hips, and little more.

The costume worn in one of the largest gymnasias for ladies in New York consists of a fairly loose bodice or blouse covering the hips; knickerbockers to just below the knee, gathered into a frilled band; dark red stockings, and white shoes. The dress is made of white flannel or serge, and is trimmed with narrow gold braid. A similar costume to this is worn (except as to the ornamentation) at several of the classes to which we have already referred as being established in some of the poorer districts in the south and east of London.

It is difficult to over-estimate the benefits which are being conferred, and which will in the future arise, from this common-sense and laudable endeavour to grapple with the widespread and far-reaching evils of narrow shoulders, rigid, stiff joints, unused muscles, pigeon chests, and cramped movements which so often

affect even middle and upper class girls, and seem the only heritage of multitudes of their poorer sisters born in the cities of our land. And with reference to the latter we personally know of many cases in which wonders have been wrought (after only two or three months of physical drill and recreation, on one or two nights a week) in the little, weakly gutter children in the east and south-east of London.

A short description of a recent visit to one of the ladies' classes at a gymnasium in London, may prove interesting to our lady readers, for whom, indeed, the present article is principally intended. In the proprietor we had discovered an old acquaintance, for it came out in the course of our correspondence that he had been instructor at the large public school to which we went years ago. At first he demurred to letting a gentleman be present, very properly saying that he did not as a rule permit gentlemen to witness the girls' and ladies' classes, but an explanation that the visit was not one of mere curiosity, but that we hoped to embody the things we learnt and saw in an article for the benefit of other girls and their mothers, brought us a cordial invitation to "look in and see my ladies' class any Thursday afternoon you may be in the neighbourhood."

So it happened that one Thursday afternoon soon afterwards we found ourselves being initiated into all the mysteries of the newest and most approved apparatus which have been the outcome of practical experience in many instances, and have embodied in them the results of years of thought. Whilst we were chatting with the instructor in the lower hall, inspecting the fittings and appointments, the pupils were getting ready for the afternoon's work, which was to take place in the upper or larger gymnasium. The instructor was just saying he would like us to see one of his children's classes, when his wife came down to tell us that it was past three o'clock, and that the young ladies were ready and waiting.

As we entered the gymnasium it seemed

positively alive with girls (ranging in ages from twelve to twenty), most of them dressed in their trim and pretty knickerbocker costumes, with red facings, or a trimming of white braid, &c. For a moment or two the appearance of a "stranger in the house" caused a slight flutter and stir, and we noticed a few sly glances at the intruder, a pulling straight of skirts and sashes, and a tidying of tumbled locks. However, the curiosity did not last long, and when we had mounted the gallery reserved to the use of spectators, and had settled ourselves into a snug corner where we could sketch in peace, except for an occasional glance, the girls seemed quite unconscious of any unusual presence, and soon lost themselves in the exercises.

How evidently they enjoyed the marching and counter-marching! And very pretty they looked filing off in single, double, treble and quadruple columns; some, probably the beginners, with serious faces, others smiling and laughing and stepping out with the confidence and precision of experts; all keeping step and time with an accuracy which would have done credit to a regiment of the line.

And after this came a little rest (?), the climbing ropes, poles and ladders being assailed by even the youngest of the girls, who climbed with a skill, *abandon*, and fearlessness which spoke well for their training and the absence of "nerves." Some clambered in this way up to their friends in the gallery, and one sunny-haired, short-skirted girl of 15 or 16 suddenly swung herself up a rope which was hanging just in front of where we were, and after sitting astride the balustrade for a minute or two, shyly glancing at the sketch-book, ran along to chat to a knot of girl friends who had been admiring on-lookers.

In a few moments, however, the summons was given, and the girls who were climbing found their way down again, hand over hand, to take part in some of the less risky of the exercises with the horizontal bars and vaulting horse. One could hardly help smiling as the pupils, one after another, came, some of them tumbling,

over the wooden horse, mounting and vaulting it with a confidence and grace that would have made many of their brothers envious, if not positively jealous. The girls were evidently bent on enjoying themselves, no sense of "mock modesty" hampered their freedom of movement, and for once at least "tumbled frocks (if one can call a short blouse such) and truant locks" only provoked a smile, and not annoyance.

Then we witnessed a set of very pretty, and to us it seemed very complicated, dumb-bell exercises, which were gone through with a smoothness and accuracy that spoke volumes for the control of the instructor, who conducted from an elevated platform at the end of the gymnasium.

Next and last of all came what we think the girls must call one of the "jolly exercises," the storming board. And now sketching became impossible. All we had was a sort of vision of laughing faces; running girls, hopping girls, and jumping girls, falling girls and girls who stood for a moment or two on the edge of the board hesitating to jump, all enjoying themselves, and conclusively proving that many of them could run, climb, and jump as well as boys, if they were only allowed to do so, and were permitted a sensible gymnasium dress to do such things in.

We had spent a very pleasant afternoon, and went away, after taking leave and thanking Mr. A—, more than ever convinced that one of the best things for a girl is a course of gymnastic training, carried out under the direction of an intelligent and competent instructor. Any mother who still hesitates to send her girls to a gymnasium for fear of their becoming "tom-boyish" or rough cannot do better than visit a first-class gymnasium and witness one of the classes. We fancy such fears will soon be dispelled, and that she will then hesitate before confining her daughters' bodies in unhealthy garments, and condemning them to flabby muscles and narrow chests.

There are now, in public and school gymnasias,

more than 40,000 girls who are receiving some sort of physical training in England and Wales alone, and every year will in the future, we sincerely believe, tend to give us a better physical standard of our race, and help us to attain unto the ideal of physical beauty which must result from a revolt from the false and unnatural training to which, in the past, the feminine half of humanity has been subjected. C. H.

## THE WINTER CLIMATE OF THE ISLE OF MAN.

OUR remarks on this subject, published in the February issue of HYGIENE, seem to have been rather sceptically received by some of our contemporaries. We therefore reprint the following interesting article, which recently appeared in the *Isle of Man Times*. Mr. A. W. Moore is a well-known authority on all meteorological matters; we quoted largely from his book on the climate of the Isle of Man, in the notice of that health-resort (HYGIENE for August, 1890). The table of figures we then copied from Mr. Moore's book is worthy of reproduction.

### AVERAGE WINTER TEMPERATURES.

Brighton ...	...	...	...	...	40°.7
Ventnor ...	...	...	...	...	42°.6
Bournemouth ...	...	...	...	...	42°.0
Isle of Man ...	...	...	...	...	42°.0

The Manx average winter temperature contrasts favourably with the three noted health-resorts in the South of England, a point of which the significance is heightened by the fact that while the annual mean temperature is very little higher at Brighton, Ventnor, and Bournemouth than in the Isle of Man, the extreme variation is less in the last-named locality than in the other three.—Ed. HYGIENE.

### "THE GREAT FROST OF 1890-91.

"This title has not been chosen for its appropriateness to the weather in the Isle of Man, but simply because it is used by the English newspapers in discussing the frost of the past

two months (which is said to have exceeded any frost of the present century in duration, though not in severity) over the greater part of England, and more especially over London and the south, and because it will serve to accentuate the extraordinary difference there has been between the temperature here and in England during the above-mentioned period. Comparing Greenwich with Douglas, we find that at the former the frost lasted for fifty-nine days—from November 25 to January 22; while at the latter there were never more than five consecutive days on which the temperature fell below freezing point. The thermometer at Greenwich was continually below freezing point for ten days, while this did not occur on a single day at Douglas. The mean temperature of the whole period at Greenwich was  $29^{\circ}5$ , while at Douglas it was  $38^{\circ}7$ , or  $9^{\circ}2$  in excess; the mean of the highest day temperatures at Greenwich was  $34^{\circ}0$ , and at Douglas  $41^{\circ}8$ , or  $7^{\circ}8$  in excess, and the mean of the lowest night temperature was  $25^{\circ}0$  at Greenwich, and  $34^{\circ}5$  at Douglas, or  $9^{\circ}5$  in excess. The highest day temperature exceeded  $40^{\circ}$  on ten days at the former place, and on thirty-six days at the latter, having twice been over  $50^{\circ}$ ; while at the former it was below  $32^{\circ}0$  on twenty-six days, and not once at the latter, the lowest having been  $35^{\circ}5$ . The lowest night temperature went below  $20^{\circ}0$  ten times at Greenwich and only once at Douglas, the actual lowest temperature at the former having been  $12^{\circ}0$ , and at the latter  $19^{\circ}5$ . Snow has been frequent in England, while here it only fell in any quantity on one day, and this soon disappeared, while the ice here was strong enough for skating on part of one day only. Such facts as these should lead those who are in search of a comparatively mild climate during the winter within the limits of the British Islands to come here when the next 'cold snap' arrives. It should be stated that in the Hebrides a slightly higher temperature has been recorded than at Douglas, but then they are not within ten hours of London, and have not the excellent hotel and lodging-house accommodation available here.

A. W. MOORE, F.R.M.S."

## IS THAMES WATER FIT FOR DRINKING PURPOSES?

RECENTLY, in the House of Commons, a question touching upon this important matter was put by Mr. Tatton Egerton to Mr. Ritchie. The supply referred to was that of the Grand Junction Water Company. Mr. Ritchie said that his attention had from time to time been called to its quality. The directors of the Company entered last autumn into a contract for the construction of additional filter beds; that work was interrupted by the severe frost, but he was informed that it was now making satisfactory progress. Various samples of the water supplied by the Company had been submitted to analysis. One obtained on the 30th of January was certified to furnish no evidence of sewage contamination; but other samples were submitted on February 5th, and Dr. Frankland reported that they contained a very large proportion of organic matter, chiefly of vegetable origin. Dr. Frankland stated that he had never met with a sample of water so strongly contaminated with organic matter, and only on one occasion within his experience, viz., in 1868, was there any near approach to this degree of pollution. It was repulsive both to the eye and to the palate. The cause of contamination was the presence to a most abnormal amount of organic and vegetable matter in solution. In consequence of the heavy rains following the frost the Thames was for some time in an exceedingly muddy condition. Mr. Ritchie thought the difficulties of the Company would not have arisen if they had had a proper storage and filtration area.

So much for the official reply. But the water came from the Thames, like the bulk of the water supplied within the metropolitan area. Now that the inhabitants of London are becoming alive to the importance of getting the water supply under their own control, as is the case with Glasgow, Liverpool, Birmingham, Bristol, and other large towns, it is desirable that they

should also weigh well in their minds whether it would not be prudent to inquire into the possibility of obtaining a better and purer supply than that afforded by the existing eight large companies, who derive half, at least, from the Thames and the Lea; both notoriously impure, and having a population of hundreds of thousands of people resident in their immediate vicinity, above the intakes of the companies.

The following are the particulars of the sources whence these companies derive their supply, with the average daily quantity:—

1. East London; Thames, above Sunbury, wells, and Lea, 38,483,764 gallons.
2. New River; Lea, Springs, and wells, 29,124,355 gallons.
3. Southwark and Vauxhall; Thames near Hampton, 22,649,810 gallons.
4. Lambeth; Thames near Molesey, 17,533,470 gallons.
5. Grand Junction; Thames near Hampton, 16,747,932 gallons.
6. West Middlesex; Thames above Hampton, 15,044,540 gallons.
7. Chelsea; Thames near Molesey, 10,671,110 gallons.
8. Kent; deep wells in the chalk; 11,224,000 gallons.

Total, upwards of 162 millions of gallons daily.

Why should the health of millions hang upon a mere thread, as it were, for the only excuses that the Grand Junction Water Company could offer for the filthy state of the water supplied by them in the early part of February were that the Thames was unusually muddy, that their filter-beds were inadequate, and that their storage was insufficient. As regards the two last excuses, they are simply shameful; but the unfortunate consumers suffer, and the Company, like the jackdaw of Rheims, is "not a penny the worse." In fact, by and by, when the question of compensation crops up, the Company's counsel will quote, with glib complacency, the large sums paid by the

long-suffering consumers, in support of the Company's enormous claim for disposing of its rights. So will it be with the other seven Companies. But, great as the question of compensation is, there remains another still greater question—Is Thames water fit for drinking purposes?

CAVEAT EMPTOR.

## Reviews and Notices of Books.

*Lectures on Massage and Electricity in the Treatment of Disease.* By THOMAS STRETCH DOWSE, M.D. Pp. 379. John Wright and Co., Bristol.

BOTH of these methods of treatment have, unfortunately, been largely seized upon by quacks as affording a ready means of extracting money from the pockets of their victims, many thousands of whom must look back with anything but pleasurable feelings to the time when they allowed themselves to be duped by unscrupulous individuals advertising from so-called institutes or schools of massage. The author of these lectures is at some pains in his preface to disavow any connection with such places, or similarity of motive with their conductors. It is quite unnecessary, however, for him to take this trouble, as his professional status is more than sufficient guarantee on this point. Dr. Dowse has produced an excellent treatise, which will prove particularly useful to medical practitioners wishing to keep themselves abreast with the most recent advances in the two specialities with which the book deals.

There is a prevalent idea that massage is an ancient form of treatment, but this is erroneous, as Dr. Dowse points out. Rubbing and anointing with oil or ointments were, of course, commonly practised in olden times, but the author claims for massage more than is implied by such operations, viz., that it consists of a series of

movements classified and arranged in order to produce certain definite well-known physiological effects, while its combination with the induced electric current adds considerably to its remedial value.

But rubbing alone—*i.e.*, friction of diseased parts with the palm of the hand—has from the earliest records of medicine been found efficacious in certain forms of disease; and Dr. Dowse gives numerous passages from the works of Hippocrates and other old writers in evidence of this fact. We have it on the authority of Plutarch that Caesar was in this way cured of general neuralgia; and rubbing was greatly in vogue amongst the Romans. In connection with this subject an amusing story is told of the Emperor Hadrian (who built the wall from the Solway Firth to the Tyne). One day, at the public baths, the Emperor noticed a veteran soldier rubbing his body against a marble pillar, and he enquired of the man why he did so? “Because I have no slave to rub me,” said the veteran. The Emperor was so struck with the old soldier’s answer that he made him a present of two slaves, with a sufficiency for their maintenance. Some few days afterwards, the report of the Emperor’s munificence having been circulated, several old men, actuated by the hope of similar good fortune to that of the veteran, rubbed themselves against the wall of the public baths when the Emperor was paying his customary visit. The Emperor’s attention was drawn to them, as they anticipated, but shrewdly guessing their object, the Emperor gave orders that they should be made to set to work to rub one another.

Massage has received much more attention from Continental physicians than from medical men in this country, owing, doubtless, in some measure to the want of a convenient and comprehensive treatise on the subject. This desideratum is now completely supplied by Dr. Dowse’s book. The lectures deal with the principles of massage, the mode of its application, massage of the various principal parts of

the body, massage in the special treatment of the diseases for which it is indicated, and electro-theurapeutics. The book is profusely illustrated, containing upwards of sixty engravings, from which the student of massage will derive great assistance.

*The Care of the Skin in Health and Disease.*

By F. AUGUSTUS COX, M.B. Pp. 56.  
London: Alexander and Shepheard.

If there be any part of the body which Hygiene takes more specially than any other under her care, it is the skin. Further, it affords an indication of the state of health of the individual, and of the degree of civilisation of the community. Cleanliness, according to the proverb, is, at any rate, next to godliness, and a very practical authority has put on record his opinion that the civilisation of a State may be measured by the quantity of soap which it consumes. In the olden times it was too much the custom to associate sanctity with indifference to ablution, and as a consequence, St. Stylites and other holy men of dirty and carefully self-neglected habits, were regarded as living in the odour of sanctity. In the present day their odoriferous quality would seriously impair their title to respect. It is a singular fact, that while the Jews, in accordance with the Mosaic sanitary code, alleged to have been derived direct from God, pay much attention to personal cleanliness—a matter in which the Mohammedans vie with them—the Christians, notwithstanding the importance which they attach to the rite of baptism with water (theoretically washing, or cleansing) not unfrequently neglect to wash their “vile bodies,” to an extent that is positively disgusting. We once heard a story bearing strongly upon this point. A large firm of iron-founders in one of the midland counties were in the habit of treating their employés every summer with a trip by railway to a seaside resort on the eastern coast, where

the men availed themselves of the unwonted pleasure of "a dip in the briny," for this purpose using the bathing machines. On one occasion two men were bathing from the same machine, when one remarked to the other, "Jim, you're rather dirty, ain't you!" "Well," replied Jim, in an explanatory and apologetic tone, "I got too late to the station last year, and so I missed the excursion train." Yet, in the town where he worked, Jim might, on any day in the twenty-four months which elapsed between his two sea-baths, have obtained a good hot or cold bath for twopence, the price of a glass of beer. We said just now, on any day; we should have said on any week-day. But why should the working-classes be debarred of the privilege of using the public baths on Sunday? Admitting that cleanliness is next to godliness, we might at least give cleanliness a chance. Active agitation has long been carried on for the opening on Sundays of public museums and libraries; to these we would add public baths. Many operatives are almost, if not wholly, prevented by their long hours of work and the arduous nature of their labour from visiting such institutions on week-days. Are they, on that account, to be prohibited from carrying out the scriptural injunction, "Wash and be clean"?

Although public baths are with us a matter of recent introduction, the Romans established them upon a scale wholly unknown to the moderns. At one period no less than 900 of these establishments existed in Rome, many of them being magnificent in their proportions as well as in their fittings. Gibbon, in his "History of the Roman Empire," describes the baths of Caracalla (early in the third century of the Christian era) as occupying a space on the Avertine Mount one mile in circumference, and open to all citizens at stated hours. They contained above 1,600 seats of marble; in the baths of Diocletian there were still more, namely, 3,000. "The walls of the lofty apartments were covered with curious mosaics that imitated

the art of the pencil in the elegance of design and the variety of colours. The Egyptian granite was beautifully encrusted with the precious green marble of Numidia; the perpetual stream of hot water was poured into the capacious basins through so many wide mouths of bright and massy silver; and the meanest Roman could purchase with a small copper coin (an *as*, about half a farthing) the daily enjoyment of a scene of pomp and luxury which might excite the envy of the kings of Asia." Truly, a brilliant and graphic description! But for practical purposes, the frequenters of our public baths could do without so much pomp and luxury; they could dispense with marble seats, curious mosaics, and bright and massive silver conduit pipes; but they do often demand, and with much reason, too, a perpetual stream of water, instead of the niggardly, intermittent supply which causes the contents of the swimming bath to appear as green, though not so precious, as Numidian marble. Luxury and elegance are relative terms, and dispensable matters; but managers of public baths should bear in mind that clean, fresh water is a positive necessity.

Dr. COX commences with a description of the physiology of the skin; next, he treats of baths and bathing, including cold, hot, mineral, pine, mud, air, and vapour baths. In other sections may be found valuable particulars concerning soaps, cosmetics, clothing, exercise and diet. In short, Dr. COX's book is full of useful and interesting information.

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I. — *Ambulance Work.* II. — *Nursing and Hygiene.* H. K. Lewis, 136, Gower Street, W.C.

DR. LAWTON ROBERTS, the author of these excellent and popular works, was one of the most distinguished students of University College in his time, and his well-earned triumphs at the London University brought his brilliant student career to a close. It

may be a matter of regret that the rich promise of his youth has not found greater scope than in a life of toil and obscurity as a busy colliery surgeon, although the highest prizes of his profession in some great town seemed within his easy reach. However this may be, Dr. Lawton Roberts is not altogether out of touch with the literary and scientific world, and his predilection for natural history is not unlikely to bear good fruit some day. His two books on "Ambulance Work" and on "Nursing and Hygiene," are excellent of their kind, clearly and accurately printed, tastefully bound, and last, but not least, delightfully written. They have, we think, no rivals, except Professor Esmarch's "Lectures on Ambulance Classes," but the latter is too sketchy to do full justice to the whole field. Now Dr. Lawton Roberts has preserved a happy mean: he avoids diffuseness and over great brevity, and provides intelligent students with perfect handbooks.

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*Chattie; or, the Boatman's Daughter.* By  
CARRIE S. MATTHEWS. Elliot Stock, 62,  
Paternoster Row, E.C.

WE have lately received a charming little book, printed on excellent paper and prettily bound. The narrative is simple and unpretending, but withal fascinating, while the tone is very high. The book is one we should be glad to think would have a large circulation. It is admirably adapted to young people, so that nothing better could be found for prizes for girls' schools and Sunday-school classes, though perhaps we should not do full justice to the little book if we conveyed the impression that it was only suited to young children. Many readers of riper years and larger experience will find in its 106 pages some charming descriptions and delightful passages.

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The *Revista Internazionale d'Igiene*, published monthly at Naples, entered upon its second year of existence with the January number.

It contains a large amount of hygienic literature, contributed by an able staff of contributors of various nations besides Italy (hence its distinctive title), and is under the direction of Professor Eugenio Fazio, lecturer on hygiene at the University of Naples. The January number includes amongst its contents original and selected articles on biology, bacteriology, public health, adulteration of food, sanitary engineering, climatology (a special contribution on the climate of the Island of Capri), and other sanitary subjects. We congratulate Professor Fazio on the progress of his periodical, and heartily wish it increased and continuous success.

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## Notes and News.

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THE STATISTICS OF THE INFLUENZA EPIDEMIC of last year in Austria have been published by the Austrian Board of Health. From these figures we learn that in the whole of the Austrian Empire 930,000 cases occurred, 42,000 of which were in Vienna alone.

THE DIETARY OF AN ITALIAN PEASANT is composed of black bread, beans, cabbages, onions, and wild herbs, with a small quantity of inferior oil, fruit, and macaroni. Tea, sugar, and other similar commodities, which have become daily household necessities amongst the poorest of the working classes in England, are absolutely unknown to the Italian field-worker.

SARDINES AND NIHILISM do not appear at first thought to have anything in common, but the Russian police have arrived at a different opinion. For some time past sardine boxes, seemingly containing only the harmless table delicacy, have been cunningly filled up with Nihilist documents, which have thus escaped the vigilance of the authorities. Orders have therefore been issued that all sardine boxes are to be opened at the custom houses on the frontiers.

**FASTING BY PROXY.**—Two fashionable ladies were discussing how they could observe the season of Lent without inconveniencing themselves or interfering with their numerous social engagements. At length a bright idea struck one of them. "Well, my dear," she said, "we must do something, and as we cannot ourselves fast, at least we can make our servants fast."

**THE OLD WAY AND THE NEW.**—From the household book of the Northumberland family for 1515, we learn that the sum expended in housekeeping was a thousand pounds yearly; this included the maintenance of 166 persons, and wheat was then 5s. 8d. per quarter. The family rose at six o'clock in the morning; and my Lord and Lady had placed upon their table, at seven o'clock, a quart of beer, a quart of wine, two pieces of salt fish, half a dozen red herrings, four white ones, and a dish of sprats. They dined at ten, and supped at four in the afternoon. The gates were all shut at nine, and no further egress or ingress permitted. But now,

"The gentleman who dines the latest  
Is, in our streets, esteemed the greatest;  
But, surely, greatest of them all  
Is he who never dines at all."

**COFFEE.**—Some interesting statistics respecting this article of universal consumption have lately been published in the *Economiste Français*. The growth throughout the world is estimated at 862,700 tons annually, of which more than half is produced in Brazil. The other countries growing large quantities are Central America and Mexico, 80,000 tons; Java and Sumatra 60,000 tons; Hayti and San Domingo, 43,000; Arabia, Abyssinia, and Madagascar, 35,000; Cuba and Porto Rico, 35,000; India and Ceylon, 30,000; and the West Coast of Africa, 19,500. The consumption is greatest in Europe, 430,000 tons; the United States and Canada, 265,000; South America, 41,500; Asia, 40,000. Great Britain and Ireland consume yearly 14,000 tons of coffee.

**OPIUM.**—In India there are two great Government opium factories. The largest of these is at Patna. Here the manufacture is carried on during the summer, and in the winter the opium is packed and distributed. The stock in the immense warehouses at the close of the manufacture reaches a total value of £4,000,000! The other great factory is at Ghazipur, near Benares. The production reaches 60,000 chests a year, half of it being consumed in India, and the profit to the State is from five to six millions sterling.

**THE CENSUS.**—The preparations for the census are proceeding apace, and Mr. Humphries, from the Registrar-General's Department at Somerset House, who has charge of the arrangements, is busily engaged in the extensive temporary buildings recently erected on the waste land behind Great George Street and Parliament Street in supplying information to the 3,000 registrars and the 600 inspectors who will superintend the army of 40,000 enumerators who are to be engaged in taking the census next month.

**A WHOLESALE FRUIT.**—Speaking of apples, as Professor Faraday said, there is scarcely any article of vegetable food more widely useful and more universally liked than the apple. A raw, mellow apple is digested in an hour and a half, while boiled cabbage requires five hours. The most healthful dessert that can be placed on the table is baked apple. If taken freely at breakfast, with coarse bread and without meat or flesh of any kind, it has an admirable effect on the general system, often removing constipation, correcting acidities, and cooling off febrile conditions more effectually than the most approved medicines.

**LONDON WATER SUPPLY.**—The London Water Commission Bill, introduced into the House of Commons on February 20th, proposes to create a new governing body in London, viz.:—a Water Commission, to consist of fifty-one members, of whom five are to be nominated by the

Corporation, and twenty by the County Council. It is doubtful if such a Bill will pass, the general feeling being that the future control of the water supply should be entrusted to the London County Council, and not to a composite Commission.

ETHER DRINKING has become such a common practice in the North of Ireland that the Irish Government have given instructions to schedule ether as a poison, so that it can only be obtained under proper legal restrictions.

THAMES WATER.—In the recent discussion in the House of Commons on the Metropolitan Water Supply, Sir J. Lubbock expressed the opinion, with which the House manifestly concurred, that no additional supply ought to be taken from the River Thames.

CANE SUGAR AND BEET SUGAR.—The authorities of Kew Gardens have issued a bulletin, giving interesting particulars concerning these two products. The author of it does not believe that beetroot will eventually supersede the sugar-cane, but he points out that improvements might be made in its growth and management, instead of the unscientific mode of cultivation often followed in the West Indies.

A SIMPLE BUT GOOD TEST OF MILK.—Place a polished knitting-needle upright in a glass or jug containing milk; then withdraw it. If the milk is pure a drop of the fluid will adhere to the needle, but if it is adulterated with water no drop will hang to it.

ADULTERATION OF LARD.—Four years ago the Association of Pork Butchers in Manchester and the district drew attention to the then common practice of adulterating lard with stearine, cotton-seed oil, and other substances. Since that period a sharp look-out has been kept upon offenders in this respect, with the satisfactory result of greatly reducing the frequency of this adulteration. Out of 1,145 samples of lard examined in twelve years by the district analysts only forty-two were found to be adulterated.

## PUBLISHERS' NOTICE.

# HYGIENE,

*A Monthly Sanitary and Social Magazine.*

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### CONTENTS OF NO. 38 (FEBRUARY).

Cycling and its Uses. By Dr. Crespi.  
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## IS THAMES WATER FIT FOR DRINKING PURPOSES ?

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By JABEZ HOGG, M.R.C.S.,

Consulting Surgeon to the Royal Westminster  
Ophthalmic Hospital, &c.

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THE very pertinent question, put to the readers of HYGIENE, as to the fitness, or wholesomeness, of Thames water for drinking and domestic purposes, may appear to many to have received a conclusive answer in the negative from the President of the Local Government Board, in his reply to a question put by a member of the House of Commons, and quoted in HYGIENE, as to the contaminated condition of the Thames water delivered to a large portion of London by the Grand Junction Water Company; this fact appears to me to bring home very forcibly to water consumers the dangers incurred by drinking Thames water. The Grand Junction, be it observed, is one among the five water companies that derive their water supply from the Thames. Dr. Frankland, it appears, is quite shocked by "the repulsive condition the water presented during the last month or two, both to the eye and the palate." From personal knowledge, I am quite justified in saying this eminent chemist is not given to extenuate or set down aught in malice regarding the shortcomings of the London water companies.

From his remarks, then, and the attention drawn to them in Parliament, it may be said, without fear of contradiction, that Thames water is unfit for drinking purposes, or it would not have called forth so emphatic a condemnation from all parties. I may add, too, that Dr. Frankland's report of the unfitness of the water is fully borne out by men of science and chemists, who devote attention to the water question, and who, at the same time, are perfectly unbiassed and untrammelled in their judgments as to the quality of the water supplied to London. Thames water is undoubtedly most shamefully—nay, dangerously—contaminated by sewage and organic matter, as we know to our cost, by the repeated outbreaks of many serious forms of disease: typhoid fever, diphtheria, cholera, etc. I am aware, however, that a fact so patent to most of us is denied by the water companies, and on the authority of their own chemists, who, I believe still hold to the old method of water analysis; that is, to the exploded theory of a *chemical analysis* being sufficient to determine the purity of Thames and other river waters. Londoners have for some time past received two periodical reports of the condition of the London Thames water—one from the Government Water Examiner, the other from the chemists of the water companies, and these are more frequently than not quite contradictory of each other—

nevertheless, it is an undoubted fact that the infective organic matter contained in Thames water—that most detrimental to health—is completely destroyed and dissipated by chemical analysis, and, therefore, the conclusions arrived at in the laboratory are either misleading or utterly fallacious. Dr. Frankland and his son, Dr. Percy Frankland, have for some few years past resorted to the more scientific method of water purification, and they now contend that no analysis can be trusted “that does not rest on a biological and a chemical basis,” which, in plain language, means that the question of water purification can only be satisfactorily determined by a resort to a threefold process—the biological or physiological, the microscopical, and the chemical. For this important generalisation in water testing we are altogether indebted to the labours of the medical profession, rather than to the test tube of the analytical chemist. The water companies naturally ignore the more exact methods: they prefer an older one which imparts a *couleur de rose* to an unwholesome water. Dr. Frankland entertains, however, no manner of doubt on the subject, because he knows, like myself, no practicable process whereby sewage can be removed from so polluted a river as that of the Thames. It must, however, not be supposed that, because the Grand Junction has been found out, the other four companies drawing the whole or the principal part of their water supply from the same source are, or can be, by any possibility, freer from reproach. By turning to the reports published by the several Royal Commissions appointed by Parliament between 1851 and 1868, it will be seen that as it was in the beginning so it will be to the end of the chapter. It would, perhaps, scarcely be considered fair to draw conclusions from the earlier reports issued now nearly half a century ago, as the Thames at that period was known to be in a most filthy condition, from the immense volume of sewage pouring into it on both sides of the river. I will therefore turn to the report of the

Royal Commission on Water Supply, 1869, for evidence of the contaminated state of the water then supplied to London. We find it stated in this report:—“That *when efficient* measures are adopted for excluding the sewage and other pollutions from the Thames and Lea, and their tributaries, and for ensuring perfect filtration, water taken from the present sources will probably be suitable for the supply of the metropolis.” Although there have been improvements made in the disposal of the sewage of some of the larger towns since 1869, yet none of these improvements have taken the form of sewage exclusion. It is merely sewage purification that has been attempted, and not sewage exclusion. Indeed, the expense involved in carrying out any scheme for its exclusion from the rivers is so great as to render such a plan practically *impossible*. What has really been effected with regard to the sewage of the towns and villages on the Thames is chiefly by way of chemical treatment, irrigation, or intermittent downward filtration. But the adoption of processes of the kind contribute merely to improve the water to the eye, and separate the coarser suspended matters; for not one of them, when carried out with all possible care and efficiency, offers any sort of guarantee against the further admission into the Thames and Lea of noxious ingredients, and which may at any time be present in sewage, and become the active agents in spreading zymotic diseases. The chance of such morbific matter gaining access to the river is, by the process referred to, no doubt diminished; but in the interests of the public health the fact cannot be ignored that there is at present no evidence whatever that these processes are effective, either for the retention or destruction of the poison of a fever or of cholera, which are too often present in sewage-contaminated water. It is an undeniable fact that, notwithstanding any more recent improvements which may have taken place in the disposal of town drainage, the river Thames

still receives an enormous quantity of raw sewage, together with effluent water from sewage works which have been constructed in many places. Indeed, the task of banishing these and other most objectionable pollutions from the river is, the Commission declares, "*an entirely hopeless one.*"

From this and other reports presented to Parliament, we obtain a glimpse of the unsavoury and unwholesome state of the Thames and Lea, and such official statements are entirely borne out and emphasised by the reports presented to Parliament year after year by the Thames Conservancy Board, upon whom devolves the arduous duty of enforcing,—to the best of its ability, no doubt,—the several Acts of Parliament passed for the prevention of sewage pollution from towns on the banks of the river, the discharge of rubbish and ashes from vessels and houseboats, etc. On reference to the report of last year, seventy-seven convictions in respect of these various offences on the river below Staines were obtained. The Board, however, regrets that legal difficulties which have arisen in dealing with the pollution of the river Thames greatly impede its labours. To meet the difficulties in question, the Conservators have caused samples of the discharge to be taken from a very large number of houses from which pollution passes into the river. After analysis of the samples, notices were served, under the Thames Navigation Act, 1866, on the individual owners and occupiers of the various houses referred to, requiring them to discontinue the passage of sewage or other offensive matter into the Thames within thirteen months, the shortest time prescribed by the Act. The Conservators' officers are still engaged in taking samples, and trying to stem the torrent of pollution, but without any visible permanent results. The impossible nature of the task undertaken by this costly Board is only too clearly seen in its annual reports. Its labours may be well likened to that of the fabled Sisyphus, who—

"With many a weary step, and many a groan,  
Up the high hill he heaves a huge round stone;  
The huge, round stone, resulting with a bound,  
Thunders impetuosity down, and smokes along the ground,  
Again the restless orb his toil renews,  
Dust mounts in clouds, and sweat descends in dews."

That the work of the Conservancy Board can be said to be in any way more successful may be verified by anyone who will be at the trouble and expense of leisurely ascending the upper reaches of the Thames, say above the intake of the water companies, from Kew to Cricklade or Lechdale. On both sides of the river he will encounter a thousand-and-one tributaries, from the dirty Mole, Wey, etc., to the smaller rivulets of the blackditches. On the banks, and extending as far as the eye can reach, will be seen more than two and a half million acres of heavily manured land, towns and villages, dwelling-houses large and small—in short, a riparian population of about a million and a half; factories, paper mills, sewage works, and towns, all sending in effluent water and sewage, putrid and fresh, to say nothing of the hundreds of house-boats of all sorts and sizes, which on regatta days increase a thousandfold; and last, although not least, the surface storm-water, which periodically floods the land, and then makes its way to the Thames basin, carrying all before it, as it did the second week in the month of March, after the snowstorm, when the river became swollen and overflowed its banks, flooding hundreds of cellars from Teddington to Hammersmith. Very little has been done or can be done in the way of purifying the river, or, indeed, in preventing the tons upon tons of filth, accruing from the immense population spoken of passing into the Thames; and in the report of the Royal Commission, to which I have already referred, the hopelessness of doing so is frankly admitted. At page 428 I find it stated that "although the improvement of the excrementally polluted water by filtration may be considered on *theoretical grounds*, to afford some feeble improvement and protection to the public

against the propagation of epidemic diseases, no trustworthy evidence *has been adduced in support of such a view.*" Again, "of all the known processes of filtration which have been proposed for the purification of Thames water polluted by excrementitious matters, there is not one which is sufficiently effective to warrant its use for dietetic purposes, should it be shown to be so contaminated." Should anyone have a lingering doubt of the fact here stated, I would refer him to one of the most eminent of sanitary authorities, Sir John Simon, who, in his report to the Local Government Board on the epidemic visitations of cholera in 1849 and 1854, tells us how these were brought about; how, indeed, two of the London water companies performed a most remarkable biological experiment, unconsciously of course, on the lives of the inhabitants of their districts.

"Throughout the investigated districts masses of similar population were dwelling side by side; and the exterior influences which affected them were, with a single exception, apparently identical. The one varying condition was the quality of water, as consumed in different households. The rival mains of two companies were often running parallel in the same streets, the Lambeth Company pumping from the higher part of the river, the Southwark and Vauxhall Company from the lower; the former furnishing as good a water as the Thames could supply, the latter water swarming with infusorial and bacterial life, and containing unmistakable molecules of excrement. About 25,000 houses derived their water from the Lambeth Company, and nearly 40,000 from the Southwark and Vauxhall Company."

During the cholera epidemic of 1854, Sir John recorded the following facts:—

"In the 24,854 houses supplied by the Lambeth Company, comprising a population of about 166,906 persons, there occurred 611 cholera deaths, being at the rate of 37 to every 10,000 living. In the 39,726 houses supplied

by the Southwark and Vauxhall Company, comprising a population of about 268,171 persons, there occurred 3,476 deaths, being at the rate of 130 to every 10,000 living. The population drinking dirty water accordingly appears to have suffered three and a-half times as much mortality as the population drinking other water."

In an analysis of the cholera death-rate of 1848-9, a further phenomenon appeared. The Lambeth Company, which in 1854 gave the superior water, was in 1848-9 purveying even a worse supply than that of the Southwark and Vauxhall Company. It was also seen that the tenantry of the Lambeth Company (a population of 166,906, comprised in 24,854 houses) lost by the epidemic of 1853-4 611 persons. By the epidemic of 1848-9 in the same houses the deaths were 1,925.

The earlier figures show that this population suffered in 1853-4 not a third as much as its neighbours; and subsequent figures prove the further fact that *it suffered also not a third as much as at the time of its unreformed water-supply.* On the other hand, the Southwark and Vauxhall Company, which pumped an impure water in 1848-9, pumped even a worse water in 1853-4; worse, because the larger population and more extended drainage of London had given it a denser infusion of sewage. Accordingly, in 1853-4 their tenantry suffered 3,476 deaths, against 2,880 registered in 1848-9 for as many of the same houses as were then existing."\*

Hitherto, some people have been comforting themselves with the idea that these horrible impurities were chemically changed and destroyed during their course down the river, by the operations of nature; but the careful and conclusive experiments conducted by officially appointed men of science show that such assumptions are fallacies; for Her Majesty's Commissioners say, "Thus, whether we exa-

\* Sixth Report of the Rivers Pollution Commission.

mine the organic pollution of a river at different points of its flow; or the rate of disappearance of the organic matter of sewage or urine, when these polluting liquids are mixed with fresh water and violently agitated in contact with air; or, finally, the rate at which dissolved oxygen disappears in water polluted with five per cent. of sewage;—we are led in each case to the inevitable conclusion that the oxidization of the organic matter in sewage proceeds with extreme slowness, even when the sewage is mixed with a large volume of unpolluted water, and that it is impossible to say how far such water must flow before the sewage-water becomes thoroughly oxidized. It will be safe to infer, however, from the above results, that there is no river in the United Kingdom long enough to effect the destruction of sewage by oxidation."

It has since been determined by a series of well-conducted experiments that it is an egregious blunder to suppose that oxidation of sewage, the destruction of excrementitious matter, and noxious bacteria, take place in rivers by a natural process, the flowing of water down to the sea. Nothing of the kind; the little improvement that takes place in flowing water is entirely due to the sunlight, and the more refrangible the rays, the greater the destruction of infective micro-organisms. Therefore, without sunlight no oxidation can take place, although the oxygen present in the water of the upper Thames and in which healthy water-weeds grow freely, will necessarily lend a helping hand.

Much stress has also been laid on the importance of boiling doubtful water, as well as filtering it, but the ova of micro-organisms are not easily killed by boiling, nor are they affected by a low temperature and a prolonged frost; and, therefore, should there be an outbreak of cholera, or typhoid fever, at any point above the intake of the water companies, the spread of the disease is pretty certain to take place. Of this fact I gave a striking example in a former paper. I instanced the

outbreak of typhoid fever at Farncombe, which ended in the deaths of several of the victims. The River Wey, the offender in the instance spoken of, joins the Thames some distance above the intake of the companies. I admit, however, that the filth accruing from such a source is not all poured into the Thames. Molesey and Ditton, some decade since, boasted of having several hundred cesspools. These, for the most part, existed at the time of the Richmond dispute with the Lambeth Water Company. During the investigation of the legal assessor a most remarkable piece of evidence came out. This company and the Chelsea Company draw the greater part of their water from the Thames in proximity to these towns. The surveying officer of the Lambeth Company admitted, in cross-examination, that the water held in suspension a good deal of both organic and mineral matters. The Molesey authorities were about this time wanting to abolish cesspools and intercept the sewage and submit it to an irrigation process; but on investigation it was found that the Lambeth Company stood in the way of this improvement, for it was already intercepting 2,000,000 gallons of water from the gravel-bed subsoil of Molesey. The explanation given of this was that the company some time before had been engaged in laying down 4,800 feet of perforated pipes, parallel with the Thames, and the work was greatly impeded by an immense body of subsoil water, which proved so troublesome to the engineer that he was obliged to put down a culvert and pump up the water into the company's reservoir; and so it was noised about that the Lambeth Company were pumping up deep well water. On a more careful examination of the fact it was found not to be so pure and spring-like in its character. Indeed, the opposing counsel—Mr. Michael, Q.C.—in his cross-examination of the engineer, said, "This water is neither more nor less than diluted sewage." The engineer replied, "Oh no, it is not, for it has

been filtered and submitted to our chemists, who pronounce it pure and wholesome water." The culvert referred to is reported to be open jointed, and was at the time, if not now, liable to be fouled by any of the remaining 770 cess-pools that existed and endangered the health of Molesey. The statement, then, that the Lambeth Company was supplying spring water ("pure spring water," say their servants) to London was a pure fabrication, and it followed that the chemical analysis made to show its purity could not be relied upon. Moreover, just above the intake of the company at Ditton, the filthiest of filthy streams, the Rythe, pours its black water into the Thames. It enters opposite the sewage works of Hampton Court Palace. This subsoil water of the Lambeth Water Company receives recognition in the latest reports of the water examiner. In his official report he says the Lambeth Company draws its supplies from the Thames at Molesey, and from springs from the gravel-beds and chalk at West Molesey and Ditton. The Grand Junction derives its water supply from the Thames and similar subsoil gravel-beds about Hampton.

In 1880 I made a very careful inquiry, microscopically and biologically, into the fitness of Thames water for drinking purposes, and I came to the conclusion that it was a most unsafe source whence London should draw its water supply. Numerous examples occur to me of epidemic outbreaks which have been most distinctly traced to drinking Thames polluted water, but space will not allow of my making further reference. Apart from these several independent outbreaks of fever, cholera, and diphtheria, no medical man will assert that the continued use of water polluted by sewage, if even in infinitesimal quantities, can do otherwise than lower the tone of the system generally; just as we see daily going on among ruddy and robust children brought from the Hampshire or Surrey hills, and made to dwell in the overcrowded lodging houses, and the

close unhealthy courts of London, breathing impure air, and drinking even more dangerously impure water.

The present Parliament evidently leans to the proposal, emanating from several quarters, notably from a constituted authority, the County Council, asking for powers to buy up the water companies. It is therefore of grave importance that the truth should be known as regards the impurities of the water of the rivers Thames and Lea, and upon which London chiefly depends for its daily water supply. Moreover, specialists and water engineers, who have fairly estimated the wants of London, assure us that we have very nearly reached the maximum quantity of water possible to abstract from both the Thames and the Lea, and should an unusually dry summer season occur, London will find itself within measurable distance of a water famine. With a lowered quantity, the quality of Thames water will naturally be infinitely worse than it is at the present time. The filth poured into it will assume a worse and more concentrated form, and thus be so much more dangerous to health. The companies now supply five and a half million people, and the annual increase of population is 130,000. The quantity of water the companies are permitted by Act of Parliament to draw from the Thames is 110,000,000 gallons a day, and no more than 20,000,000 gallons a day from the Lea. In July, 1890, the quantity drawn from the Lea was 59,000,000, and in May, 1890, it was 61,000,000 gallons. The daily amount drawn from the Thames was 98,000,000 gallons in July, 1890. Thus it will be seen that the position is really becoming serious, and the outlook gloomy in the extreme, unless new sources are found from whence London may secure pure water, one of the first necessities of life. Sir John Simon, in the report already referred to, pertinently remarks: "This power of life and death in commercial hands is something for which, till recently, there has been no precedent

in the world, and even yet the public seems not to be entirely awake to its importance." This is an admitted truism.

Lest it should be said that my proofs in support of the unwholesomeness of Thames water are exclusively drawn from old sources, and that great changes for the better have since come about, I will direct the attention of my readers to the last report presented to the Local Government Board by General Scott, the water examiner. The conclusions he arrives at, both as to the fitness of the Thames and Lea, as sources of potable water to the Metropolis, are summarised as follows:—

"Draining as they do thickly inhabited areas with a population aggregating above the intakes of the companies to about 1,400,000 persons, they are exposed to risk of pollution throughout the whole, but more especially in the lower part, of their course, and the continuous growth of the population tends to increase the difficulties connected with the diversion from them of sewage and refuse matters. Seeing that in the valleys of the Thames and the Lea there are towns, villages, and detached houses, the drainage from which reaches the water-courses in a foul or more or less imperfectly purified condition, and that manure is largely used in the fields, it is manifest that the rivers must carry away impurities of animal in addition to those of vegetable origin. This being the case, there exists always the possibility of the introduction of specific matter of a noxious character, and hence the necessity for ceaseless effort in the interests of sanitation within the areas referred to."

So far my remarks have not gone beyond the chemical and biological evidences of the unfitness of Thames water, but there is yet another piece of evidence to be adduced not much less important than either of these; I refer to the microscopic. The limited space, however, at my command will scarcely permit of my doing more than scant justice to a method of water examination by means of which it dawned upon the official mind that the purity of water, as revealed by a chemical analysis, is almost worthless unless assisted by the microscopist and the biologist. Thus, Thames water may, after passing through a filter bed, have a bright and clear appearance and be pronounced a pure and wholesome water.

But this the biologist and microscopist will at once pronounce to be a fallacy. There can be no doubt whatever, that the brightest and clearest looking water may hold in suspension or solution a deadly organism, an invisible pathological ferment undiscoverable by the most carefully conducted chemical analysis. It is further established beyond a doubt, by bitter practical experience, that the most virulent zymotic disease will be communicated and propagated by a pellucid and bright-looking water. Nevertheless, it may be discovered too late to avert fatal consequences that it contained the germs of typhoid fever or cholera derived from sewage contamination. The information acquired, within the last twenty years, with regard to river water pollution, has been of inestimable value to the medical profession in forming a correct diagnosis of disease. Those microscopic living organisms, generally recognised as bacteria, and known to science under the names of microphytes, schizomycetes, saccharomycetes, &c., nearly all of them belong to the great genus, fungi or moulds. The rapidity of their multiplication, should they have gained entrance into the system of man, beast, or bird by the alimentary canal, may be gathered from a single instance: A pigeon was inoculated with an extremely diluted fluid containing the bacilli of fowl-cholera, on the death of the bird at the end of twenty hours the number of bacilli found in its body exceeded twelve hundred millions, a reproduction of 60,000 by each bacillus introduced. Such is the astonishing power of multiplication possessed by these pathological microbes. I have heard it remarked that ignorance is bliss in connection with the dangers of infective bacteria; but it is only the wise among us, knowing and recognising the vast importance of the subject, who are able to avoid the evil, and prevent them killing off annually hundreds of thousands of human beings. It may be safely predicted that on taking specimens of water from any part of the rivers Thames or Lea we shall be

certain to meet with evidences of organic impurities. During the summer of last year I procured a large number of specimens of water for microscopical examination from these rivers, chiefly with a view of assisting in the water enquiry undertaken by the Corporation of the City of London, and I may at once say that the opinion I was led to form of ninety per cent. of the samples was that in no respect were they better or safer to use for drinking purposes than those obtained and submitted to careful microscopical examination some ten or twelve years ago, and which I reported in the *Times* newspaper and other periodical sources of information. All my later specimens were seen to contain moving organisms, various minute forms of animal and vegetable life, entomostraca, filiform worms, amabæ, fragments of muscular fibre, starch granules, fatty matters and vegetable tissue, most of which had, no doubt, passed through the digestive organs of man or animal.\* Other coarser particles were met with, but as these were of a less noxious nature I pass them over. On exposing specimens to the action of light in my study, the germs of microbes, before undiscoverable, were rapidly developed, some specimens positively swarmed with bacteria, thus proving the water capable of providing them with food and nourishment in considerable quantities. To describe these very minute bodies individually, or speak of them collectively as a genus, they measure from the  $\frac{1}{5000}$  to the  $\frac{1}{50000}$  of an inch, their movements being usually regulated by a motor fibre, a flagellum situated at the extremity of the body. Their outer covering, or skin, so to speak, is chiefly composed of cellu-

lose; this enabling them to resist the action of strong acids as well as extreme variations of temperature. As an instance, I have placed them in strong acid solutions and found them at the end of twenty-four hours lively and apparently unaffected. Life is even more persistent in their spores or eggs, and therefore it is almost impossible to say when a colony of bacteria has been entirely destroyed. There are of course many varieties or species of bacteria, one or two of which are harmless, the rest being poisonous or pathogenic, that is incitative of some virulent form of disease. From this rapid sketch of their natural history it may be inferred that all attempts to sift or filter them out from a sewage-polluted water must be regarded as quite impossible. I gather from the report of the late Colonel Bolton that he was pretty much of the same opinion as myself. He says that 55 per cent. of his tested samples of water contained moving organisms, and that "in wet seasons, when the rivers are in flood, the water distributed to London generally contains a very large proportion of organic matter; and quite recently the water supplied, both from the Thames and Lea, contained more than an average proportion of organic matter, and there is no certainty that the water does not contain the germs of zymotic disease, because we have no guarantee that morbific matters do not gain access to the rivers, and there is nothing in the subsequent treatment to which river water is subjected by the companies that will ensure the removal of matters of this description."

I believe it will be admitted that I have conclusively shown, by reference to official and perfectly independent sources, as well as from a series of carefully conducted microscopical and biological examinations, that Thames water is quite unfit for drinking purposes.

\* A woodcut illustration of a single drop of polluted water, and of the several matters it contained, will be found in my book on the microscope, 11th edition, page 751. Routledge, 1886.

## PATENT MEDICINES. No. 5.\*

MATTEI ; PATENT MEDICINE LAW ; SEQUAH'S  
OIL AND PRAIRIE FLOWER MIXTURE.

IN the *Review of Reviews* for February, Mr. Stead, writing concerning Mattei's so-called specifics, mentions that Cardinal Lavigerie (whom he quoted, in his extravagant eulogy of Mattei, as an out-and-out believer in that individual) has written to him stating that "so far as he has been able to form an opinion upon the Mattei remedies, their effect is chiefly due to their influence on the imagination." Any other man than Mr. Stead would have begun to "climb down" after the receipt of such a crushing communication, but he attempts to refute this opinion by asserting the extraordinary effects which the Mattei remedies produce on animals. On the principle of *post hoc, propter hoc*, a correspondent of the *Review of Reviews* claims that he cured a mare, "rotten with heart disease," by the administration of the Mattei preparations, and that he has also seen wonderful effects from giving them "to pet dogs that are subject to nasty sorts of fits," but he admits that absolute failure attended a trial of them in the cases of three sick calves. Poor calves! they evidently lacked the imaginative power of rotten horses and nasty dogs. Some medical men, too, have sent Mr. Stead encouraging letters. Two names are given, and one of these gentlemen, Dr. Arthur Walker, makes the modest statement that "if the patient recurs to these remedies" (Mattei's Anticancerosi) "in the initial stage, he may rest assured that he *shall* not die of cancer." To which positive assurance Echo answers "Walker!" Of the two medical men whose names are withheld, one

\* The object of this series of articles is to expose the gross quackery which the Government encourages by the granting of Patent Medicine stamps.

No. 1 (which appeared in HYGIENE for December, 1890) dealt chiefly with Mattei's Electro-Homoeopathic Remedies; No. 2 (January, 1891), Clarke's Blood Mixture; No. 3 (February), Chlorodyne and Opiates; No. 4 (March), Revalenta Arabica.

writes the following letter, in which ignorance and untruthfulness struggle for the front place, and create a strong doubt as to whether the writer has any right to sign himself "M.D.":—

"Are you unaware that our profession constantly prescribes 'secret' medicines? Here is a list of a few secret remedies, the precise constituents and preparation of which are rigidly kept secret by their owners, but which are constantly prescribed by the orthodox faculty:—

Mackerson and Robbins'	Sulpholine Lotion.
Pills.	Hunter's Cough Mixture.
Kirby's Pills.	Clarke's Blood Mixture.
Followes' Syrup of Hypophosphites	Clarke's Gout and Rheumatic Cure.
Powell's Balsam of Aniseed.	Schaifelein's Pills.
Eno's Fruit Salt.	Leville's Drops.
Elliman's Embrocation.	Roach's Embrocation.
Pepper's Nerve Tonic,	Murray's Gout Specific."

Excluding two preparations, the composition of which is openly stated by the makers, we can confidently declare that in nearly forty years' medical practice we have never known any of the remedies in this list to be administered by a single member of the "orthodox faculty" (Mr. Stead's favourite expression, by the way), and, indeed, we never before heard the names of several of these "constantly prescribed" medicines. Clarke's Blood Mixture was dealt with in No. 2 of this series of articles, and in the future numbers of HYGIENE we shall have something to say of some of the other quack remedies which the presumably bogus "M.D." has enumerated with the accuracy of a dry-goods clerk. The total number of medical practitioners whose names and addresses are published in the "British Medical Directory" for 1891 is 29,484, and we are prepared to wager a large sum, to be given to some deserving medical or Masonic charity, that "M.D." cannot prove that even half-a-dozen of these members of "the orthodox faculty" constantly prescribe the quack remedies mentioned in his list.

One of our colonial subscribers asks us how, having regard to the origin of the word "patent," that term came to be applied to preparations of which the composition is kept secret. The misnomer arose in this way.

During the reign of George III., whose obstinacy and incompetence lost our fairest colony, America, and raised the National Debt from £138,000,000 to £794,000,000, the Ministers were frequently much exercised in their minds as to means of raising money; the Chancellor of the Exchequer bethought him of quack medicines, and an Act of Parliament was passed (23rd George III., cap. 62) "to grant to His Majesty a stamp duty on licences to be taken out by certain persons uttering and vending medicines, and certain stamp duties on medicines sold under such licences, or under authority of His Majesty's Letters Patent." A subsequent Act, in 1785, designated these medicines as "prepared or compounded by any person or persons whatsoever" who had or claimed to have "any occult or secret, or unknown art, or some exclusive right or title to their manufacture," the same being advertised or recommended as "specifics or otherwise, for the cure or relief of any ailment or malady incident to, or in any way affecting, the human body." The "otherwise" in this definition applies quite as much to quack medicines at the present day as it did then, and reminds one of the wily trick played by a countryman on a rural medical practitioner. Going to the house of the latter, the countryman requested the doctor to attend his wife in a serious illness which necessitated prompt treatment, undertaking to pay the doctor's account, "kill or cure." The disease had advanced too far for the doctor's skill to arrest it, and the woman died. Later on, the doctor claimed payment from the farmer, who asked the question, "Did you cure my wife?" which the doctor answered with a melancholy shake of the head. "Surely, you didn't kill her?" was the next question, to which the doctor warmly replied with an indignant negation. "Then I don't see that you have any claim upon me," observed the farmer, reminding him of the stipulation, and walking away, leaving the doctor utterly dumbfounded and discomfited.

Referring to our subject, it will be seen that the term "patent" applied to these secret quack compounds is used in the sense of "privileged" (by letters patent), and not of "open or divulged."

In 1875, an Act was passed reducing the medicine licence duty, which previously had ranged from five shillings to forty shillings in different localities, to the uniform amount of five shillings throughout the United Kingdom. The consequence of this reduction was, as shown in an able article contributed to the *National Review* for October, 1890, by Dr. Henry W. Hubbard, to greatly increase the number of patent medicine vendors. In 1874, the year before the passing of the new Act, the licences taken out were 12,430; now the annual number is almost double that, being 21,600 in 1888. The question naturally arises, who are these patent medicine vendors? The official register of chemists and druggists, kept by the Pharmaceutical Society of Great Britain for 1888, contained 13,812 names. Deducting one-third, as being assistants and not carrying on business on their own behalf, we can account for (roughly estimating) 9,000 chemists, leaving nearly 13,000 licences in the hands of various tradesmen—grocers, drapers, and general shopkeepers wholly unacquainted with even the rudiments of chemical knowledge, yet authorised by law to deal in occult medicines, often of the most dangerous character. The ease with which these can be procured—we refer now more particularly to opiate and narcotic preparations—has led, as we pointed out in our remarks on chlorodyne (HYGIENE, Feb. 1891), to a widespread system of home-drugging, while it is undoubtedly responsible for many deaths, especially of children, not invariably arising from mere misadventure, but always difficult to detect and bring to light. Well might a coroner of large experience remark that "it is impossible to say how many infants are killed annually by soothing syrups." Every preparation of this class that we have examined contains opium in some form or other.

Various remedies have been suggested for this most unsatisfactory condition of things. Dr. Hubbard proposes the increase of the now very small licence duty to such an amount as would deter many of the present holders from dealing in such questionable and even dangerous merchandise. Others, again, urge the repeal of the stamp duty on patent medicines, because it conveys to the public a sort of Government guarantee. To our mind the question of the increase or removal of the stamp duty is of a comparatively minor character, and, as it is of a fiscal nature, might be left to the consideration of the Chancellor of the Exchequer for the time being. We should, however, lean to an increase of the stamp duty, and to a very great increase of the patent medicine licence, which ought to be restricted to chemists and druggists alone, so

to facilitate bringing the articles sold as patent medicines under the provisions of the Pharmacy Act, 1868, also called "An Act to regulate the sale of poisons," out of which section xvi., enacting "that nothing hereinbefore contained shall extend to or interfere with the making or dealing in patent medicines," should be struck.

The great reform necessary is to take a leaf out of the legislature of Continental countries, and to make it unlawful to sell any patent medicine without previously placing on the bottle or box in which it is issued to the public a legible description of the contents. By law the sale of certain articles of food, such as chicory and margarine, is prohibited without a label apprising the purchaser of the nature of the substance which he is buying. How much the more is it desirable, in the interests of the purchasers of patent medicines, that they should be duly warned as to the composition of articles which contain potent drugs inimical to health and often dangerous to life? Further, if a stamp duty be continued, it should be clearly made known that it is to be regarded as of the nature of a tax, and not—as now commonly supposed—as an authorita-

tive guarantee of the quality or value of the preparation.

But if the manufacturers of quack medicines are silent concerning the actual ingredients of the stuff concocted by them, they cannot be charged with similar reticence respecting the presumed virtues of such components. Bold assertion is their sheet-anchor, and equally bold advertisement is the talisman with which they conjure the coin out of the pockets of their credulous customers. The proprietors of quack medicines are evidently indoctrinated with the views expressed by Carlyle, when he said: "Great Britain contains so many millions of people—mostly fools," and they go for the "mostly" with an energy and determination worthy of a better cause, sparing no expense, and stopping short at no assurances.

Some little time back we bought a small bottle (two ounces for two shillings) of Sequah's "Prairie Flower," and sent it to an analyst for the purpose of examination. But why examine it (some may ask) in face of the published analysis, and of the statements made in the prospectus which accompanied our purchase? Well, we like to be independent, and as we did not stand in need of Sequah's stuff ourselves, while we have too much regard for our quadruped friends to experiment on them, we had no alternative between smashing our shilling per ounce treasure, or forwarding it to Mr. Stokes; so to his laboratory it went.

In a circular headed "Sequah's Prairie Flower, and all about it," is a most glowing description of the mineral springs of the Pacific slope of North America, as described by Professor M'Nutt, of San Francisco. From this the transition is easy to the wonderful springs in the borders of the Montana Territory, "the most noted of them all" having been secured by purchase by Sequah, Limited, "as far as Europe and the United Kingdom are concerned." If anyone should doubt this, he can test it by application to the "company's London solicitor," in whose hands the legal documents

have been placed; but, through some oversight, both the name and address of this official have been omitted. Next, we learn that the Edinburgh *Evening Dispatch* of Thursday, January 10th (no year given), suggests that invalids, to obtain benefit, must go out and take the waters on the spot. "This is all very well," continues the compiler of the prospectus, "as far as a few wealthy individuals are concerned, but it is utterly impossible for the poor, for business men, and for the bulk of the middle classes, who can spend neither the time nor the money for so costly a trip. But as the people cannot go to the springs," the writer adds (displaying his ecstasy in capital letters) "SEQUAH HAS BROUGHT THE SPRINGS TO THE PEOPLE. It was found that the water could be concentrated by careful evaporation, and still retain its curative virtues; and SEQUAH, LIMITED, took advantage of this fact, and made it their business to bring these waters before the public in a CHEAP AND CONVENIENT FORM. But Rheumatism is closely associated with the great group of STOMACH AND LIVER COMPLAINTS, and it was found necessary in order to insure a COMPLETE AND PERMANENT CURE, to combine this mineral water with certain VEGETABLE EXTRACTS, several of which are also valuable Indian medicines, and found in the woods and prairies of the Far West. And thus compounded, PRAIRIE FLOWER is undoubtedly far and away the best remedy ever yet introduced for all sorts of complaints and other CHRONIC DISEASES."

Moreover, we learn from another prospectus that "this wonderful and world-renowned preparation" has been in use amongst the Sioux, Cherokees, Comanches, Apaches, and several other tribes of North American Indians for hundreds of years. Steady, there, Messrs. Sequah, Limited! If the North American Indians have used this "wonderful and world-renowned preparation" for a period extending as far back as the discovery of America, how comes it that you claim to have

invented it? We enjoyed for many years a friendship with the late Mr. Catlin, the eminent traveller, who spent much of his life (more than a quarter of a century) amongst the native tribes of North America, and we have, on numerous occasions, discussed with him the primitive remedies employed by the Indians. Never, either in his conversations, or in the published accounts of his travels, did Mr. Catlin even refer to the "Prairie Flower." Yet he was a keen observer and a careful recorder of all that related to the habits and domestic customs of the Indians, with whom he lived upon such terms of intimacy as no other white man has ever done before or since. The fact is that the prospectus writer is all wrong, for aloes, the "botanic extract" found in "Prairie Flower," are obtained from the East and West Indies, where the North American Indians are not likely to have gone in search of that drug, so that the "Far West" statement is obviously *far-fetched*. There is absolutely nothing new in the administration, medicinally, of such an old pharmaceutical acquaintance as aloes. Consequently the sole novelty consists in falsely describing the countries whence this drug is procured. Another matter to which we would draw attention is that aloes is uncertain, and in the case of very delicate persons and children often injurious, in its action, unless regulated by other medicines combined with it, but if people take so little trouble as not to learn whence a drug comes, they can hardly be expected to inform themselves as to its properties.

At the same time that we sent the "Prairie Flower" to our analyst we also submitted a bottle of Sequah's Oil for examination. The following is a copy of his report upon both articles.

Analytical Laboratory,  
Vestry Hall, Paddington Green, W.,  
March 13th, 1891.

DEAR SIR,—On February 20th I received from you a two-ounce bottle of "Sequah's Oil" and a two-ounce bottle of Sequah's "Prairie Flower." These were still

in unopened wrappers, and were sealed by the unbroken patent stamp of the Inland Revenue.

On analysis, I found as follows:—

The "Sequah Oil" consists of a mixture of two-thirds turpentine and one-third fish oil, scented with a few drops of oil of camphor.

The "Sequah's Prairie Flower" contains in the two ounces:—

Water - - - - -	735 grains.
Aloes - - - - -	105 "
Carbonate of Soda - - - - -	35 "

and a few drops of the tinctures of capsicum and myrrh.

This medicine being reputed to be made from a "Mineral Water and Vegetable Extracts found in the Far West," I carefully looked for the usual constituents of ordinary mineral water; but, excepting the carbonate of soda, I found none.

I remain,

Yours faithfully,

ALFRED W. STOKES, F.C.S., F.I.C.,  
Public Analyst.

The carbonate of soda is apparently added for the purpose of keeping the aloes in a state of solution, so that it looks very much as if the vaunted "Mineral Water" came from the Sequah tap.

Mr. Stokes is prepared to stand by his analysis, which we may mention, in passing, illustrates the great stride made by scientific chemists in the last few years. In January, 1889, barely two years ago, Mr. William Johnstone furnished to Sequah, Limited, an official certificate (published in the prospectus) wherein, after stating that he made a minute examination of "Prairie Flower," which convinced him that it did not contain any poisonous alkaloid (no one, by the way, seems to have suggested that it did), he concludes by saying "I am satisfied that the 'Prairie Flower' consists of the extracts of certain vegetable substances, the nature of which at present is beyond the reach of analysis to separate." We make Sequah, Limited, a present of the complete analysis for publication wherever and whenever the Company may please.

As regards the Sequah oil, that is decidedly fishy, like the method resorted to by Sequah, Limited, for getting publicity for their wares. The bulk of quack preparations obtain notoriety through newspaper advertisements and mural

posters; but Sequah, Limited, taking advantage, as their prospectus author would say, of the presumed connection between a watery solution of East and West Indian aloes and a combination of fish oil with turps, and the North American Indians, send out itinerant lecturers—half sham-Indian, half English "Cheap Jacks"—into the market-places and highways to spout rhapsodical praises of Sequah This and Sequah That. These lecturers, more numerous by far than the knaves in a pack of cards, are distributed in various towns, and succeed, at any rate in one thing, and that is in disturbing the peace and quiet of any locality that they may happen to select. Being glib of tongue, ready with clap-trap talk, and liberal in treating the mob, they soon get around them a set of partisans, whose number is rapidly swollen by loungers and others.

A correspondent has favoured us with a description of these meetings, from which we will quote:—

In a field there was drawn up a highly-decorated circus-car, which during part of the day had paraded the streets, with a brass band sitting in it. Flaring-lamps fixed on poles served to brilliantly light the scene. Preceded by a band, the Sequah lecturer drove up to the car in a two-horse landau. Taking a seat at the front of the car, he proceeded to produce letters from his pocket, open, and silently peruse them, apparently jotting down their contents. Meanwhile, he would now and then be interrupted by messengers bringing bouquets of flowers, fruit, and more letters. After about ten minutes or more of this elaborate dumb show, he would rise and remove his overcoat and broad-brimmed sombrero hat, showing a mass of black greasy, wavy hair, a string of boars' tusks round his neck, and garments of the cowboy style with which Buffalo Bill's followers made us familiar. Then he would read aloud a number of letters of thanks for cures effected, or asking for more medicine. After a little talk about the extent to which the Sequah remedies were spreading, he fitted on his forehead a small electric lamp, the portable battery of which was carried in his pocket. Those persons who desired to have teeth removed were invited into the car. I saw between thirty and forty men, women, and children step up, one at a time, and with the aid of the electric lamp, their teeth were taken out, some having as many as three or four extracted. The operation was rapidly performed, but an ominous snap now and then told to the initiated that a tooth had been broken in. When the cries of the sufferer who was being

operated on were loud and expressive, the brass band stationed at the rear portion of the car struck up lustily, so as to drown the sound, and the only air that they played during the whole time was singularly selected, being the negro melody, "Who's dat calling so sweet?" Then came more boasting and more letter reading. After this those in the crowd who had been cured of rheumatism were requested to come into the car. Some four persons accepted this invitation, bent their arms up and down, which they said that they had not been able to do previous to treatment, or jumped about before the spectators. Then followed the sale of Sequah preparations at two shillings a small bottle, and the stuff went off at a lively rate. Occasionally those having rheumatic limbs were rubbed in the car by the lecturer or his attendant for half-an-hour or more, and sometimes said that they felt better. When the rheumatic cripples had ascended the car, the lecturer generally broke their crutches, then "massaged" their limbs, and finally bade them to walk away. One unfortunate fellow hobbled from the car to the edge of the field; but, crutchless as he was, he could get no further, despite the vigorous and long rubbing that he had been subjected to.

It is now well understood that any benefit which the sufferers may receive is entirely due to the "massage," or careful rubbing; also, that the cases are selected. There is no inherent curative virtue in the Sequah oil, as shown by the circumstance that, in the majority of cases of alleged cure, the relief is not permanent, while home trials frequently fail altogether.

Even the so-called cures are not all so genuine as they are made to appear, as the following anecdote will prove. A lady residing at Surbiton Hill had a gardener who, though somewhat stiff in his joints, after the wont of gardeners through the nature of their employment, could do a good day's work every week-day. When a Sequah lecturer was at Kingston-on-Thames, this lady heard so much about him that she made up her mind to drive down and hear him hold forth. As she sat in her carriage outside the concourse of people, what was her astonishment, on seeing a patient hoisted into the car (with much labour by four men), at recognising in him her gardener! After a while, she saw him run nimbly down the steps. Next day she taxed him with all this, and said, "Surely, gardener, you could have got into the car without giving all

that trouble?" To which he replied, "Oh, yes, mum, but them's the orders!" From other reports which have reached us, it is evident that whatever doubt there may be as to the disorders which the Sequah specifics can relieve, there is room for none as to the definite nature of the orders issued to exhibition-patients by the Sequah lecturers.

The tooth-drawing, which helps greatly in also drawing a crowd, while the rapidity of it visibly impresses the spectators, is rather mixed in its results. "Who's dat calling so sweet?" may serve effectually to drown the cries of a sufferer who gets a broken tooth for his pains, but it does not do away with the significant fact that, as we have heard dentists assert, there is always a greater demand for stump-removal after the Sequah lecturer has left a town than there was prior to his visit. Sound teeth must not unfrequently be forfeited, too, in the hurry of extraction. A dental surgeon, practising at the West End, told us that, being at Wimbledon, when a Sequah lecturer was performing, he had the curiosity to get nearer, and as a man who had just had a tooth extracted passed from the platform to the crowd he asked the man to let him look at the tooth, which the operator had put into the patient's hand. "Why, it is a sound one," he exclaimed, whereupon such a hostile movement was made towards him by some excited Sequah supporters that he found it prudent to withdraw himself from the crowd.

THE EDITOR.

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### SCAVENGING, TOWN REFUSE, AND SEWAGE.\*

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By CHARLES JONES, A.M.Inst.C.E., Past President of the Association of Municipal and Sanitary Engineers, and Surveyor to the Local Board, Ealing.

In the year 1885 a meeting of the Association of Municipal and Sanitary Engineers was

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\* A Lecture delivered at the Sanitary Institute.

held at Stratford-on-Avon, the object being to see and gather up such information as was to be obtained in connection with the various sanitary works of that town. In the discussion which ensued at the close of the meeting, the veteran engineer, Sir R. Rawlinson, made the following remarks, viz.:—"There is one thing I wish to say to the governing people of Stratford-on-Avon, and that is that the foundation of all sanitary science is *scavenging*, and if I were asked what is the most important feature of all sanitary science, I would again repeat, scavenging. Your sewers, your drains, your water supply are all secondary considerations if scavenging is neglected. There should be no private vested interests in effete matter, as it should be removed by public scavengers from the premises of every individual, every manufactory, and every other place at the cost of the general body, and the cost should be paid out of the General District Rate. I say it most earnestly, and I say it most advisedly. This is contended against by some Local Boards, the members of which say they do not see why they should cleanse private establishments. But I know why this should be done: it is because if you leave it to private individuals it becomes the source of serious evil, and I say, as a last word to the people of Stratford-on-Avon, mature your scavenging arrangements and make them perfect; do not let them to any contractor, he will scavenge your town and take your fees in dry weather, but he will neglect the work in wet weather, because his contract does not cover exceptional or excessively wet seasons. The most economical way is for the Corporation or Local Board to do the work themselves under their own management." Gentlemen, these words are words of wisdom. They should be printed in large type, and hung up in every Board Room and Municipal Chamber throughout England, and become the well-remembered text, deeply imprinted upon the memory of not only every sanitary officer, but of every councillor and Local Board

member throughout the Queen's domains. I have for years advocated the purchase by Local Boards of their own stock, and the carrying out of their own scavenging arrangements. Some years since my own Board were induced to fall in with my views in this matter, and I can say most sincerely it has never been regretted. The first year we saved the cost of the horses, and ever since we have had our work done in a most economical manner, and I think I may add in a mode satisfactory to those who have to pay, as well as to the executive officers who have the responsibility, if not the praise.

This question is probably not the least important one bearing upon that portion of my address which has a reference to scavenging. The several points or details of work which come under the head of scavenging can only be touched upon, to give details is simply impossible, as the amount which has been accumulating is such that a bulky volume might be easily prepared. Suffice it to say that the Public Health Acts lay upon Local Boards and municipal authorities the onus of framing bye-laws in accordance with the various sections of the Act, and upon their officers rests to a great extent the responsibility of carrying them out; and I should in parenthesis remark, that although much has been said of late, in Parliament and out of Parliament, by the Press and on the platform, as to the importance of passing new Sanitary Acts for the purpose of dealing with some of the crying sanitary evils of the day, my own candid opinion is that, if the several Acts already in existence were honestly and fearlessly carried out, there would be little need for fresh legislation upon the subject.

The first item that comes to our notice is undoubtedly the "dust bin," the fruitful source of very much of the difficulty with which we have to contend, more particularly perhaps in that almost chronic state of fog in which it is the lot of many of us to live. The Act provides that every newly-erected house should have a

dust or ash bin, with proper doors and coverings, and the model bye-laws deal with the subject in no fewer than six separate clauses, all of them presuming that the ash pits are to be built of brick. This is undoubtedly an error. A brick dust-bin is a small fever factory, bad when filling, and for some hours after being emptied (unless deodorised, which is rarely done) a pestiferous nuisance. My practice is to insist as far as possible upon the movable galvanized dust-bin—one that can be carried upon a man's shoulders. As a rule one is ample for a moderate-sized house—two being necessary for a large house, and generally these are sufficient to contain all legitimate house refuse for a week; the old brick bins, whenever I get the opportunity, I condemn without hesitation. I will not touch upon the power of the local authorities to erect public bins; the particular circumstances of each district must be the principal factor in this as in many other clauses of the Act; nor upon the disputed question of trade refuse—I find a small charge gets over this difficulty; suffice it to say that the sanitary well-being of the neighbourhood must stand first in settling the question. I cannot, however, avoid referring to the somewhat ridiculous 43rd sec. in the Public Health Act, which provides that a Local Board shall (after receiving notice from an occupier that an ash-bin is a nuisance) be liable to a penalty if the same is not cleared within seven days. I think I may add that the common sense of those who have to deal with a matter like this, although protected by the above clause, would lead them to provide a remedy within seven hours instead of seven days.

The question of the best time and mode of removal is a larger one, and much might be said, but I consider that a removal of once-a-week is sufficient in ordinary cases, and, so far as the vehicle is concerned, the tilting waggon is by far the best. The old-fashioned dust-cart should be discarded, as expensive in wear and unsatisfactory in quantity. The present style of

cover, viz., the tarpauling, should be abolished, and the circular galvanized hood should be substituted, so doing away with the very perceptible nuisance which probably all have experienced when following an uncovered dust cart on a windy day, and I cannot help thinking that, of the various modes of collection, that now generally adopted is the best, the rounds or districts being so arranged that once every week the dust van passes every house, and the D card in the window (with the instructions at the back) indicating to the men the fact that their services are required. No doubt a daily collection, as is the custom in some Continental cities, is the most perfect, and it has been carried out to some extent in one or two districts in London, but will not, I think, ever become a fixed and unalterable rule.

One of the most trying things connected with scavenging is the sudden and often unexpected fall of snow. It tries the scavenging department to the extreme, the more so as it is of comparatively rare occurrence, and most uncertain in the continuance of its visits when it does come. I always look upon the provision which compels each householder to cleanse in front of his own premises as an extremely wise one. The many can do, with but small trouble or expense, that which becomes almost impossible in any other way, as every sanitary officer will admit—with some ten to twenty miles of roads, with double that mileage of paths, under his care—and I hold that a Board is perfectly justified in putting the penalty clause in force against those who wilfully ignore the small amount of responsibility thus cast by Providence upon them. The question of the roadway is, however, far different, and here the officer has to contend with a serious difficulty. Fortunately in England, at any rate in the south, snow is rarely very deep, nor does it lay very long upon the ground. Various modes have been adopted, and one, notably the melting process, was tried to a considerable extent some few years since, but it has not found

general favour. The method I adopt is to use the ordinary horse road scrapers. This season I purchased a scraper with a larger tooth or tongue, taking a 15-inch board. This answered admirably, but of necessity the work must be commenced before the snow has been travelled over. A ridge is formed on each side of the road, well clear of the channel, occasional passages being cut through to allow of persons crossing, and vent for the melting snow. In the vicinity of shops carting must be done, but on all other lines of road ordinary attention in keeping the channel clear meets every difficulty. As a matter of interest in connection with this subject, I will refer to the Report made by Mr. C. H. Lowe, the Surveyor to the Vestry of St. John, Hampstead, in January 1886. He says:—"In order to show the extensive nature of the work, and the almost insuperable difficulties surrounding the question of snow removal, I have carefully gone into the question as far as this parish is concerned, and have to state that the length of main roads in Hampstead parish is about  $9\frac{1}{2}$  miles, and of side roads  $29\frac{1}{2}$  miles, making a total of 39 miles; the length of channel is about 80 miles, and the number of gullies about 2,400. I calculated the snow at an average depth of eight inches, and, allowing for waste, that would give a total fall equal to 148,296 cubic yards." In connection with the subject, Mr. Lowe estimated the cost of clearing and carting to a shoot in the parish, to be as follows:—

Cartage .. .. .. ..	£7,414
Labour, sweeping, filling carts to shoot, &c. .. .. ..	4,661
	£12,075

or equal to a rate of 6d. in the £.

In the parish of Islington, where labour could be much more readily obtained than at Hampstead, the absolute cost for the removal (upon the same occasion) of 9,027 cubic yards of snow (exclusive of cartage) was £815.

*Road Watering.*—The question of road watering is one which has, I think, received but

scant attention at the hands of the engineers, and is a subject which has, in my opinion, been more fairly treated in other countries than our own. The excuse may probably be that the intermittent character of our climate has had something to do with it. Very little advance has been made upon the heavy, cumbersome two-wheeled cart. Bayley's Hydrostatic Van was the natural outcome, and, advantageous though it be, I still look forward to a more economical mode of dealing with this important question of road watering, for it must be borne in mind that road watering is not the mere luxury of a non-dusty road, nor a simple cooler of the atmosphere on a sultry day; but a road preserver and maintainer of the highest importance. It would be unfair not to admit that other plans have been tried. For instance, some years since, in Princes Street, by the side of the Bank of England, a very ingenious experiment was made. A line of pipe was laid by the side of the kerb, with fine perforated holes in it, and, the stopcock being opened, a fine spray was shot from both sides into the centre of the road. The idea was good, but its practical working one fine day—when the road was covered with vehicles, and suddenly from each kerb thousands of jets went simultaneously to work—can be better imagined than described. Confusion worse confounded reigned, and many a well-meant curse fell upon the head of the hapless inventor. Nevertheless, the idea was a sound one, but the expense was an insuperable objection—other matters might have been got over. The reel-and-hose was and is still used, and under many circumstances is a most useful contrivance, but is comparatively valueless in a thoroughfare where there is much traffic, and the same remarks apply to the apparatus now used very much in Paris, and in many of our own parks. A new water van called "The Willacy" has lately been brought out. Its action is said to be good, but, from the sketches I have seen, is somewhat complicated. It is,

however, well spoken of by a friend in whose judgment I have great confidence. The makers are Glover and Sons, of Warwick.

*Road Cleaning.*—We now turn to the extremely important and difficult question of road cleaning. There can be no doubt that to a great extent the credit or otherwise of a town or district is dependent upon the condition of its roads. A dirty sloppy road, with untidy and uncleanly paths, will always be a source of discomfort to the inhabitants and discredit to an officer, and the point is how to arrive at a happy medium, both of efficiency and economy. Hand labour *versus* machines is a vexed question in the mind of the public officer. The former is undoubtedly, on macadam and flint roads, the best for the road itself, removing only that which should be removed, and leaving the more valuable grit to become again incorporated, filling up the interstices, and giving a fair working lease to the road—and here I may remark that I consider the broom which has been for many years the only one in use an unmistakable blunder. It is three times as heavy as it need be, and consequently a principal cause of the large cost of hand labour over machines. Those which I have seen used on the Continent, I think in the centre of France, were about one-third the thickness. They did the work quite as well and the strain upon the labourer was only in proportion to the size of the London broom. The question with the municipal officers is, however, one of dispatch, and the earlier the road is cleansed the more satisfied are the public. Consequently the horse-sweeper has now come into pretty general use, and seeing the amount of work which can be done by the machine is about ten to one against manual labour (setting aside the point to which I have referred as to destruction of material), there can be no doubt that the verdict must be given in favour of the machine. In my district I use both the diagonal horse-broom and the slopping machine—both valuable. In roads where the necessity for picking up the slush which is swept to the

sides of the road is not great, so far as time is concerned, I prefer the former; but in a main road or principal thoroughfare, where it is important that all should be clean and sweet before the passengers for the nine o'clock train to town are on the move, then the slopping machine is the only one that will stand you in good form. The particular machine to which I refer is a box about two feet deep and nine feet long, set at an angle upon two wheels, with a small centre wheel in the front. The box contains a set of brushes about four feet wide, fixed upon an endless chain working upon two axles—one top, one bottom. At the top is a species of shoot, just high enough to discharge into one of the iron-bodied, semi-circular sludge carts. The brushes are set in action by the motion of the cart, and the mud is swept up the inclined plane to the shoot, whence it drops into the cart, which is hooked at the front. Two horses are required, one in the cart and a trace horse, and when working full, five sludge carts can be kept going—as fast as one is filled it is disengaged and an empty one is hooked on. With a tip moderately handy, I have known 40 loads taken off the road before breakfast. The same machine is useful for dust, but a light watering should always be given to the road first. But I again repeat that every class of machine sweeper is to some extent antagonistic to the road itself. I have not touched upon roads where granite sets are used, nor where asphalte or wood paving has been laid down. In either of these cases the mechanical is invaluable. A few weeks since I was invited to view the working of a new machine called the "Hercules." The patentee says of it: "The 'Hercules' machine is perfection itself." Gentlemen, did you ever know a machine that was not "perfection itself" in the eyes of its inventor? He says it is ready at once, in all kinds of weather, and ever able to accomplish its tasks in a manner never as yet achieved, and never likely to be surpassed. It is to do away with "water carts," "sweep-

ing machines," "cans for the watering of streets," "squeeges and brooms," "sand carts and sand," "spades and snow carts," "material for disinfection," "large staff of men." I have extracted all this from the prospectus. It strikes me as being what we should call "a very large order," but at any rate we wish it success. A short description of it is as follows: A circular tank cart, holding 300 gallons of water, with a sprinkling hose attached in front, and a screw-shaped revolving brush of india-rubber underneath. Both brush and hose are controlled by the driver, and one horse is sufficient to draw the machine on wood or asphalte paving. According to the Surveyor of the Clerkenwell Board, one of these machines, which can be used on granite paving, effectually cleansed an area of 1,980 square yards in nine minutes, with an expenditure of 600 gallons of water. One thought crossed my mind, when I saw all this mud being washed up and floating away with the water from the machine, and making its way to the nearest gully—*How about the sewers?*

(The sections on "Town Refuse and Sewage" will be published in a subsequent number of HYGIENE.)

## WHEATMEAL BREAD.

By A. W. DUNCAN, F.C.S.

THE food we Englishmen could least do without is that prepared from the grain of wheat. It even contains everything that is required for nutrition, and these constituents are in nearly the right proportion, so that were it necessary we could live on wheatmeal bread and water alone.

The grain of wheat has a complicated and beautiful structure. If we look at the white inner part, which composes the greater portion of the grain, under the microscope, we observe that it is composed of a vast number of cells, each crowded with round masses called starch

granules. The starch granules of wheat vary very much in size; of the smallest there would be required ten thousand, and of the largest nine hundred, placed end to end, to extend one inch in length. On the outer part of the wheat grain, but underlying the husk, is a layer of large cells, of a slightly yellow colour; these are called the gluten cells. A little gluten and other albuminous matter is found in the starch cells, but it is in the outer layer that this matter exists in the greatest abundance. Gluten, albumen, and similar bodies are classified by the chemist as proteids. They are popularly called flesh-formers because they serve to build up the muscles and tissues of the body. These bodies all contain nitrogen as an essential constituent. Let us here caution the reader against imagining that all bodies containing nitrogen are flesh-formers, or that nitrogen by itself or uncombined is of any food value. At one end of the grain is the germ, wherein lies that most mysterious thing we call the life. It is from here that, were it planted in the earth, there would rise up a stem and be thrown down a root. Covering and protecting the parts we have briefly described is the *testa* or bran covering. The outer part is silicious and indigestible, but the inner part is rich in serviceable mineral matters and flesh-formers.

We will consider the disadvantages of using white bread. First, from 100 lb. of good white wheat we obtain only 73 lb. of fine flour; thus there is a great waste of human food, and the cost of the flour is increased. If the "tailings" are re-dressed and the "middlings" re-ground by the miller, thus producing a less white flour, the quantity will be raised to 80 lb., but still there is a loss of 20 lb.

Fine flour is poorer in albuminoids or flesh-formers, in fat and in mineral matters, than seconds-flour.

The bran is very rich in mineral matters and bone-formers, consequently only brown bread should be given to children, as they

require phosphate of lime for the building up of their rapidly-growing bones. A deficiency of bone-formers causes rickets. Those expecting to be mothers especially need brown bread, and it is good for the proper secretion of milk. For adults, whose bones are thoroughly consolidated, these bone-formers are not required in such quantity. The bran, and that part of the grain of wheat which lies nearest it, is the richest in compounds of phosphoric acid and in other substances which are necessary to the nourishment of the tissues; the compounds of phosphoric acid take a very important part in the nourishment of the brain and nervous system. In separating the outer or branny part of the wheat some of the floury portion—that outer part which is richest in gluten or flesh-formers, as well as in mineral matter—is unavoidably separated with it. The branny part itself contains much flesh-forming matter.

It is, nevertheless, an error to say, as is frequently done, that brown bread is richer in flesh-formers than white; on the contrary, it contains rather less. The error has arisen in the following manner:—It is impossible to separate and weigh the albuminoids in a pure form. The only accurate method is to estimate the nitrogen and calculate therefrom. It has been customary in chemical analysis to estimate the total nitrogen and calculate this into albuminoid or flesh-forming matter. This method is inaccurate because a variable quantity of nitrogen exists as nitrates, nitrites, alkaloids, and other bodies of no direct nutritive value. To obtain accurate results it is necessary, before estimating the nitrogen, to separate and reject the non-albuminoid nitrogenous matters. Adopting this method, Mr. G. W. Wigner, F.C.S., made a large number of analyses of the cereals. In fifteen samples of various kinds of wheat he found an average of 8.1 per cent. of true gluten or albuminoids; but by the old process of analysis of calculating the whole nitrogen as albuminoids the quantity amounts to 9.9 per cent. or an error in excess of 1.8 per

cent. Thus 82 per cent. only of the whole nitrogenous matter consists of true albuminoids. The difference is greater in bran, so that though the percentage of nitrogen is higher than in the rest of the grain, the percentage of nitrogen as albuminoids is less. In the bran of fourteen of the same wheats (the other sample was lost and spoilt in analysis) the albuminoids only amounted to 7.2 per cent., in the place of 10.8 per cent. by the old method. No more than 67 per cent. of nitrogen existed as albuminoids. White flour from the fifteen cereals showed 8.3 per cent. of albuminoids, against 9.2 by the old process. The proportion of nitrogen existing as albuminoids was 90 per cent. The white flour is, therefore, richer in albuminoids or flesh formers than the bran by nearly one quarter per cent. The following table will show it more clearly:—

	Wheat.	Flour.	Bran.
Total nitrogen calculated as			
albuminoids.....	9.9	9.2	10.8
True albuminoids .....	8.1	8.3	7.2
Error of old method...	1.8	.9	3.6

The difference in favour of the white flour over the wheatmeal is really a little more, as far as the albuminoids only is concerned.

The grains—of which wheat is the most valuable—stand above all other foods in their richness of phosphoric acids and in general high nutritive value, and they are the most satisfying and sustaining. It is, therefore, important that this, our most trusted food, should be of the best quality and not the white, excessively dressed, and over-fermented product supplied by most bakers. Home-made household bread is superior to bakers', but good wheatmeal bread is much better than either.

Brown bread is more satisfying than white, and from its gently stimulating nature it keeps the digestive organs and the intestines in better order, and is a preventative of constipation. To those who have become accustomed to good brown bread, white is comparatively tasteless, and on account of this insipidity it is usually

cut thin and thickly buttered, whereas brown bread may be eaten thicker, with very little or even no butter.

All brown bread is not good. The wheat should be so ground that there are no large, sharp flaky particles of bran left, as these are irritating to the digestive organs. For those with whom ordinary wheatmeal bread disagrees, there is a kind called decorticated, which has had the outermost silicious coat of bran removed. It is this outer coating which is apt to prove irritating to the digestive organs, and as this is of scarcely any nutritive value, it is advantageous to remove it. It is a good plan to have one's own steel mill; for if we grind our own meal, not only can we have it of just that degree of fineness we prefer, but when freshly ground it produces a better flavoured loaf.

Wheatmeal bread is often sodden and heavy from improper baking. When carefully made it is delicious, but if made in exactly the same way as white bread it is apt to be unsatisfactory. The outer part of the wheat, which is retained in wheatmeal, contains a starch ferment called cerealin, and when the flour is allowed to remain too long in the "sponge," the natural process of conversion of starch into starch sugar goes on to an excessive extent, and the yeast fermentation acting with it, produces a heavy bread.

Much of the brown bread of the shops is made from white flour to which a little bran has been added. Not only is this deficient in nearly all the good qualities of wheatmeal—the more valuable middlings, sharps, and fine pollard being excluded—but owing to the bran being in a flaky instead of a finely granular condition, it is apt to irritate the digestive organs. Much of bakers' brown bread, although made from genuine wheatmeal, has had a large proportion, often half, of white flour added to it.

Wheatmeal bread, from properly ground flour when not over fermented, is easy of digestion. The bran gently stimulates without irritating the digestive canal, promotes healthy action, and

prevents constipation. The mineral matter, particularly the phosphates and the potash, supplies necessary food for tissue change and nutrition, especially brain food and bone material. The gluten, or albuminoid matter, is in a spongy or finely-divided condition, which can be readily acted upon by the gastric juice in the stomach. The starch, which forms the greater part of wheat, is an essential food. Starch, when swollen by cooking, is very easily digested. The digestive ferment which exists in the saliva liquefies and partially digests the starch, and though this incompletely digested is soon stopped when it meets with the acid digestive juice of the stomach, it does not impede gastric digestion. The process started in the mouth is resumed as soon as the partially converted starch passes from the stomach into the duodenum and meets with the pancreatic digestive ferment. The starch is rapidly converted into grape sugar, and absorbed into the system. Unlike flesh foods, wheatmeal bread contains all necessary constituents, flesh-formers, carbohydrates and fats for the production of heat and muscular energy, and mineral matters for the tissues and bones. The various constituents are in about the correct proportions or more nearly than any other single food. Though we are far from advocating such a practice, it is possible to sustain the body on bread alone, as has been done in several instances. It is generally considered that there exists a deficiency of fat, and this it is customary to add either in the form of butter or a vegetable oil. Not only do we advocate wheatmeal loaves, but wheatmeal paste for puddings and pies. Wheat, either whole, crushed, or coarsely ground, forms a very wholesome and nice porridge, which is delicious eaten with stewed fruit, milk, or honey.

Children are fed very much on cornflours, but these are very poor foods, incomparably below wheatmeal and oatmeal. If fed much on such foods, to the exclusion of the more nourishing, they will be puny, delicate, and inclined to rickets. Starch and cornflour are merely heat

and fat producing foods; these are important foods, but the great error is that the flesh-formers and bone-formers, which are absolutely necessary for the body, have been removed. It

is very fortunate that milk is added to these foods, otherwise the mischief to the health of children would be greater than it is.

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### ON THE USE OF ALCOHOL AND TOBACCO.

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DR. C. R. DRYSDALE, Senior Physician to the Metropolitan Hospital, addressed the Debating Society of the National Liberal Club on "The Use of Alcohol and Tobacco," on February 10th—Mr. Capper in the chair. Dr. Drysdale said that very different opinions existed as to the value of alcohol as a food or as a medicine; and of late a very unfortunate set of statistics had been promulgated by a Committee of the British Medical Association, which ought never to have been published, and which gave the result that the average age at death of 122 teetotallers was lower than that of moderate drinkers, and even of intemperate persons. He would presently show where the fallacy of this comparison of age at death lay. In the meantime these statistics had done much harm; and he heard that in the East-end of London and elsewhere the statistics of the British Medical Association Committee were posted up in the public-houses in order to prove how beneficial spirit drinking and other drinking were to the health. Even educated men had been deceived by these statistics, for Mr. Hayter, Registrar of Australia, had cited them as an authority, whilst also stating that he had some Australian statistics to prove that teetotallers had more days of sickness than non-abstainers. With regard then, firstly, to intemperate persons, Dr. Ogle, in the Forty-fifth Annual Report of the Registrar-General, taking the average mortality of all males in England and Wales

at 1,000, found that the figure for the clergy was 556, whilst that for innkeepers, publicans, and beer sellers was 1,521, and for public-house and hotel servants 2,006, or nearly four times that of the clergy. "The mortality (says Dr. Ogle) of men concerned in the liquor traffic is appalling."

It appeared that, between the ages of twenty-five and forty-five, the mortality of such persons was 22·63 per 1,000 annually, and between forty-five and sixty-five it was 53·30 per 1,000; whilst for the clergy, a most abstaining class, the similar figures were 4·64 and 15·98 per 1,000 respectively. Mr. Neison, actuary, said that "throughout the whole range of the table of intemperate persons the rate of mortality is frightfully high, and unequalled by the result of any other series of observations made on any class of the population of this country." Mr. Neison stated that, at the age of twenty, when the expectation of life in the general population was 48·21 years, it was only 15·55 in intemperate persons. One-half of the deaths for which inquests were held in London were, according to Mr. Wakley, due to alcohol. Dr. Richardson had calculated that 50,000 deaths occurred annually in the United Kingdom from alcoholic disease, and that 150,000 months of disease were caused by it. Dr. Laucereaux, of Paris, calculated that one-twentieth of all deaths in the Parisian hospitals were due to alcohol, and that next to consumption it was the main cause of premature death in Paris.

As to moderate drinking, the chances of longevity also appeared to lie on the side of the teetotallers. Among the middle-class insurers in the United Kingdom Temperance and General Provident Institution, from the year 1866 up to 1889, or twenty-four years, 4,542 deaths were expected to occur, and £983,307 to be paid by the Company in the Temperance Section, where only total abstainers were insured; but only 3,198 deaths occurred, or 70 per cent. of those expected, and only £664,832 were claimed; whereas, in the General Section, where only

moderate drinkers were insured, 6,894 deaths were expected, and £1,470,174; and 6,643 deaths occurred, or 96 per cent. of the expectation, and £1,428,671 was claimed. The bonuses had been 17½ per cent. greater in the abstaining than in the non-abstaining section. Compare these accurate statistics, said Dr. Drysdale, with the absurd ones of the B.M.A., when 122 total abstainers' age at death was compared with that of 4,112 non-abstainers.

The fallacy in the latter comparison lay in the fact that total abstainers were younger persons than non-abstainers, and this fallacy was similar to that which would compare the age at death of schoolboys with that of grown-up men. Among the humbler classes, the extreme value of total abstinence from alcoholic drinks became very apparent. The mortality of the Rechabites at all ages was the lowest of all, as compared with that of the Foresters, Adult Males of all England, and Healthy Males. At the age of 40 the mortality of the total abstaining Rechabites was 5·094 per 1,000, against 12·080, 13·893, and 10·310 in the other tables; and at 60 it was 26·131 for the Rechabites, against 33·660, 35·450, and 29·680 for the others. These accurate statistics showed that alcohol was a poison, not a food, and the advantages of total abstinence were abundantly shown.

With regard to the use of tobacco, it was calculated that about fourteen millions were annually spent on tobacco and pipes in the United Kingdom. Tobacco has been used only since 1560, and its alkaloid nicotine was a virulent poison, nearly equal to prussic acid in virulence. When smoked, other alkaloids, such as pyridine, were given forth. These were soluble in the saliva, and absorbed into the blood in small quantities, causing much disturbance when tobacco was first used by the smoker. Tobacco poisoning was like alcoholic,

of two kinds, acute and chronic. In the first, the patient sometimes died after smoking a number of cigars for a wager. In chronic poisoning the symptoms were palpitation of the heart, weakness of vision, sore throat, cancer of the lip, tongue, or throat, and sometimes complete blindness, with dyspepsia of all degrees.

In the State Factory of Austria Dr. Kistral found that youths fell sick soon after entering the works, and had symptoms as follows:— pallor, palpitations of the heart, sleeplessness, dyspepsia, and inflammation of the eyelids. The infants of the female operatives suffered greatly. Sir Benjamin Brodie used to say that if both men and women smoked the race would rapidly degenerate. Miller attributed paralysis in many cases to the use of tobacco; and Joly had urged that much insanity in France was caused by the use of tobacco. Bertillon, in 1855, showed that smoking greatly lowered the intelligence among the students of the Polytechnic School of Paris, so that a vast proportion of the prizes were carried off by the non-smokers. In Turkey, where alcoholic diseases were so rare, diseases from tobacco were extremely plentiful.

Hitherto women had been so subjected to public opinion that they had not used tobacco, which was fortunate for the health of children; but there were symptoms that even well-educated women might, ere long, become votaries of the cigarette and cigar. This, Dr. Drysdale said, would be an immense evil to the human race; and he was inclined to agree with Count Tolstoi that the use of tobacco was apt to weaken the strength of the conscience, and to tend to slovenly thinking and lazy contemplation. The use of tobacco was a mistake of modern times, and hygiene could only condemn it as a cause of disease and of many evils to society.

## HOUSEHOLD WASTE.

By A. G. S. MAHOMED, M.R.C.S., Surgeon,  
Bournemouth Hospital.

*Waste of Food.*—There is a capital anecdote which I have seen ascribed to more than one great mustard manufacturer, which well illustrates one part of this subject. The *dramatis personæ* are the G. M. M. (or Great Mustard Manufacturer) and a young lady, and the time and place presumably a modern dinner-table. Says the young lady: “Just fancy, Mr. ——, your making a great fortune out of the amount of mustard people eat.” The G. M. M.: “My dear young lady, it’s not what they eat; it’s what they leave on their plates.”

I often think of this little story. There is no doubt a waste of food at all tables. This is met in Paris by the daily collection of the broken meats from the fashionable restaurants. These are neatly arranged, dressed, and priced, and exposed on the stalls of the Halles Centrales, where the poorer inhabitants may buy for a few sous a tasty and sufficient meal.

I see no reason why such a scheme should not be worked in London. Doubtless the less appreciated parts of poultry, game, and fish are used up in soups and pies, but there yet remains a large quantity of food, cooked and uncooked, which is actually squandered and dealt with as refuse. I will venture to say that the West End of the town and the fashionable suburbs waste, daily, enough food to give all of the poor in the metropolis who go actually short of victuals at least one square meal in the twenty-four hours.

But it is not only our fellow men that are defrauded of food by our extravagant waste. A good country housewife, besides the table scraps, uses the peelings of potatoes, carrots, parsnips, turnips, etc., as well as the outer leaves of cabbage and other greens, and the less choice parts of animal food, to boil down

for the hens and pigs. Moreover, Mr. Watts has lately drawn our sympathy to a large class of fellow labourers “whose patient life of unrewarded toil” might be made a little more tolerable by a sufficiency of food. The coster’s donkey and the laundrywoman’s pony are accustomed to a diet of potato peelings, bread, and greens, but the *ménage* is not always so lavishly supplied as to have a profusion even of this kind of food.

What we want, in order to bring the waste of one end of the town to supply the need of the other, is a better system of collection. What is the present system? The hog-wash tub. Right enough in its object, but not carried out scientifically. The accumulations of a week left to putrefy in greasy water! No wonder that its collection is relegated to the hours when the streets are free from passers-by (or should be). Science teaches that one of the first requirements to putrefaction is moisture. A scheme to collect food for animals should start with providing householders, upon application, with a cheap box, having a layer of antiseptic wood-wool, or prepared sawdust, at the bottom. It is probable that, in summer time, part of the contents might be temporarily housed in ensilage pits, and distributed at remunerative prices in the winter months. At any rate a great waste might be saved and a great nuisance mitigated by the daily collection of waste food.

Another great waste occurs in the way of fats. I have seen a grease-pit in connexion with a scullery sink yield pounds of solid, stratified, fatty material. The fat is worse than wasted in this way; it is injurious. It blocks up the pit, and gives off noxious emanations. If the pit is done away with the fat helps to block up the sewers, and does injury to public health. It ought not to be there, and it ought not to be regarded as useless refuse. It ought to be saved, for it has valuable qualities. As an article of diet, fat is a great heat producer. By a process partly mechanical,

partly chemical, it can be converted into margarine, which could be used in cooking.

Again, for how many other purposes might it not be used? "Machine oils," for instance. Here is an agent that can furnish the much-desired oils. The fat of beef and mutton contains the two important compounds, "stearin" and "elain," which exist in all lubricant fats such as neat's foot and train oil.

There is another opening for these adipose remnants. As an illuminant they might be the means of conveying "light and leading" into many households. Where are the tallow candles recruited from? Once more, consider the chemical properties of fat. Unite its distilled products with alkali, and you have soap. Superheat them with steam, and you can make glycerine. And yet there are hundreds of thousands of pounds of this valuable commodity run into house drains, to annoy the residents and perplex officials. If the grease pits were made easily accessible, collectors would remove the contents gratuitously for the sake of their value, instead of their being left to accumulate, and not unfrequently become an offensive nuisance.

*Waste in Cooking.*—But besides fat, other food stuffs find their way down the sink. Boiling, baking, and roasting are still common methods of cooking; yet Dr. Letheby reckoned that beef and mutton lose

23 per cent. by boiling.

31   ,   ,   , baking.

34   ,   , roasting.

Moreover, if the water used in cooking is soft, the loss by boiling is greater, owing to its being a better solvent than hard water.

Much useful food now sent down the sink might be saved by using the new cooking apparatus which cooks by "steaming." I have partaken of a dinner cooked in this manner, when by the heat of one small flame of the size usually given by an oil-lamp, fish, flesh, fowl, onions, apples, and other articles were all appropriately cooked at one and the same time,

being placed in different compartments of a closed apparatus. Neither had the slightest taste of the other, nor of the oil flame. The whole of the juices were conserved, and I found the fish to be better flavoured than by the ordinary methods of cooking. As, moreover, it appears impossible to over-cook anything—the fish was cooking as long as the pork—it would seem to economise in the way of time and trouble as well as of fuel; that is, the plan saves waste of food, waste of fuel, which is an important item, and waste of time.

*Waste in the Dusthole.*—There are various other wastes in the economy of the ordinary Englishman's household, more especially if he is a Londoner. The dust heap is a somewhat unsavoury subject to approach. It is a nuisance to the householder while it is growing. It becomes a greater nuisance when the thirsty collectors (dustmen are a dry race) come to empty it. It is the greatest nuisance to the authorities who have to provide for its further disposal. The nuisance arises from the mixed nature of its constituents rather than from any inherent unpleasantness in themselves, and if we do away with decaying food we should remarkably lessen its horrors. We should then only have to do with cinders and discarded articles of use. From a sanitary point of view the refuse-destructor is the best means of dealing with such a heap, and there are generally by-products, slag for road-making, for example, which tend to lessen the expense. But if householders kept a separate tub for any one of their usual waste articles they would probably be paid for the material saved. It is said that some of the saucepans sold by cheap-jacks at very low figures are manufactured from Australian meat cans so collected. By the judicious employment of a little solder and a neatly fixed handle, they are again made useful. Surely all the broken lamp-chimneys, wineglasses, and other articles of glass, could be re-melted. Rags and old paper are always in

demand at the paper factories. Old clothes are torn up in the "devils" of Bradford, and issue as a new product—shoddy cloth; shoddy silk, plush, and velvet, are also made. It seems to me that the felt of old hats (of the "bowler" variety) could also be used up again. Besides the making of hats, felt is used for many purposes—for packing of machinery, washers, and other purposes, where its non-conductivity of heat render it useful, or covering roofs. Bone articles, such as the hafts of table-knives, tooth-brushes, and the backs of hair-brushes, find their way into the dustbins, but they ought to be put to further use. There are many small articles made in bone; for example, buttons, cases of pocket-knives, and match-boxes. However cheaply manufacturers of bone goods can buy material, it ought to be supplied cheaper, if only a gigantic system of collection could be organised. But if bone articles are not worked up again, their chemical properties ought to be utilised, as long as superphosphate of lime continues to be one of the best and expensive artificial manures. Hares' and rabbits' skins are bought, I believe, and turned to good use; but the skins of dead dogs and dead cats are still left on them, and thereby render the decomposition of their bodies a more tediously prolonged process than need be. The bodies of these animals, I notice, generally find their way into water, where they are very much out of place, and often a danger to health. The fruitful earth is the natural and proper receptacle for all decomposing organic matter. Chemical operations the most delicate and the most profound are here always at work. And if they are always at work, why not take advantage of them?

*Waste of Fuel.*—With regard to fuel there is still a great waste, and this waste, as with the others already discussed, constitutes a nuisance. A generation ago it seemed to be an object to burn coal as quickly as possible, and, as a necessary sequence, the heat generated went up the chimney, whither our fathers tried to

follow it, by sitting within the chimney nook. We have made some improvements lately. Coal is more slowly and more perfectly burnt, and a good deal of heat is reflected into the room. But the sparrow on the house-top still gets more than his share of warmth without contributing to the expense. A fire in a ground-floor room ought at least to heat the room above. There are several methods by which this may be done, and in Canada and Russia a fire in the basement is made to warm every room in the house.

A plan has been suggested to me which might help a little. It is to use one of Jennings' patent ventilating flues, and arrange it so as to send out warm air in the chamber above that in which a fire is used. These flues are square, and contain a cylindrical pipe, which conveys the smoke. Outside of it are four triangular chambers—the corners of the square—which contain air, heated by the passage of the hot smoke in the adjoining tube. It is easy to arrange the distribution of this hot air, at a higher level in the flue. In the matter of illumination and heating by gas or oil, improvements are constantly introduced, and one of the most promising is the application of the principle of Bunsen's burner to oil stoves. By this we utilise atmospheric air, and gain heat at the expense of illumination.

This principle of the Bunsen burner has revolutionised the system of heating by gas-stoves, and if adequate means are employed for taking the products of combustion out of the chamber there is no objection to this means of heating.

In ordinary gas illumination there is still a good deal of waste. We need to get rid of the zone of blue flame. The use of incandescent substances, which are made to give out their brilliant light under the heat of this imperfectly combusted area, as in the Wenham and other lamps, is a great advance.

So much for household waste. I will just narrate a short anecdote to point a moral.

I once attended a poor family who lived in the outskirts of a fashionable town. They were very poor, and very dirty. The father had once been a clerk; he was now selling walnuts, and was a regular, shiftless tramp, with unkempt beard and ragged clothes. The mother was in bed, recently confined. The children took care of themselves in the best way they could; when there was a meal cooked they shared it. The matter of clothes, or rather want of them, gave little trouble. One day while I was there, a rag-picker (a young man who lodged in this wretched abode) entered, and exhibited, with every appearance of pride, a ham-bone. He had picked it out of a refuse-heap, and there was plenty of meat on it. "There, missus," said he, "that'll make you some rare broth; give the young'uns summat to do, too." This was a case of the "crumbs from the rich man's table" that went home to me.

This state of affairs, that what to one class is a nuisance, difficult to dispose of, should be a want to another class, seems to cry for remedy. I also think of the crowded blocks of dwelling houses in London, where, in winter, people are freezing in fireless garrets, while their better off fellow lodgers are wasting below enough fuel and heat to warm their comfortless rooms. I think of the heat-giving substances poured into the drains, of the great pall of unconsumed gas and smoke that hangs over London, and bears witness to the great City's *Household Waste*.

#### A YARN ABOUT A BOIL.

THE crowd of loafers in the little country store at Spurville had just listened with great interest to Job Landers' account of his recent sufferings from a large boil on his leg. Various comments expressive of sympathy were offered

by one and another, but these were suddenly interrupted by Andrew Criler, who began:

"A bile's a mighty mean thing fer a man ter have, 'n' no mistake." After a short pause he continued:

"I don't s'pose I shell ever furgit one 't I had more 'n twenty year ago. 'Twas on my right arm jest above the elbow, 'n' I couldn't do anything ter speak of fer nigh onter three weeks. How it did ache! Why! I couldn't sleep a wink no more 'n if somebuddy 'd been borin' right inter that arm with an auger; 'n' it swelled up so's 't I couldn't git my shirtsleeve down over it. I had ter keep it wrapped up in an old shawl of Lyddy's all the time."

"It got so bad finally 't I jest couldn't stan' it any longer; so I went over ter old Doctor Coblet 'n' got him ter look at it.

"'Wal,' says he, 'that's a poaty bad arm, but it aint ready ter be opened yit. Ye'll have ter come agin in a few days.' So home I went, mad enough ter kill. I just walked the floor all that night, 'n' I shouldn't wonder if I said some bad words 'long to'ards mornin', fur that bile did ache wuss 'n any toothache."

"Wal, next day I went to old Coblet agin, 'n' told him he'd jest got ter open that bile right off. So the old feller cut it open, 'n—wal, mebbe I didn't holler! I thought for about a minute that I'd give up the ghost. Wal, the bile got well poaty soon after that, but it left a big scar 't I s'pose I'll alluz kerry."

"Le's see it, Andrew," cried the crowd, anxious to behold even the traces of so famous a "bile."

Nothing loth to display the memento of his past sufferings, Andrew pulled off his coat and drew up his right shirtsleeve. No sign of a scar or blemish of any kind was to be seen.

A trifle disconcerted, he exclaimed: "Thar! it's queer I sh'd furgit 'twas on t' other arm, but I guess 'twas."

Up came the other sleeve, and the crowd again pressed forward to see the scar. Alas! this arm was as unblemished as the other.

Andrew tried to look perfectly dazed at this result, but a moment later, with a twinkle in his eye, he said : "Wal, I vow ! It is queer how a man's mem'ry sometimes deceives him, ain't it ? I remember now jest ez plain 'z day that bile was on brother John's arm."

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### SANITARY INSURANCE.

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THE British public is, unfortunately, so indifferent to matters appertaining to sanitation, and so fearful of incurring expense in remedying hygienic defects, that it is only by united, continuous efforts that any permanent satisfactory results can be achieved. Individuals working for the public good are naturally apt to weary of contending against the apathy or ignorance of others, who selfishly regard only themselves, and who look on complacently so long as their own households enjoy immunity from epidemic disease. People insure nowadays against almost every possible calamity—death, sickness, accident, fire, burglary—so that it is a strange thing that so few means exist of protecting themselves against sanitary evils. It is therefore, with pleasure that we welcome an institution which will eventually be such a boon to the public that everyone will wonder why it was not established years ago.

The Health Corporation, whose offices are situated at 16, Great George Street, Westminster, almost under the shadow of the Houses of Parliament, has come forward for the purpose of doing, by combination and co-operation, what individual efforts could never have succeeded in carrying out.

Amongst the objects of the Health Corporation, as set out in the prospectus, are—to assist in the amelioration of the dwellings of the working classes; to aid the advancement of sanitary science, and the extension of sound health principles, by means of lectures, exhibitions, classes, and literature; and to issue certificates as to the

sanitary condition of houses, places of amusement, dairies, laundries, and workshops, and by systematic continuous inspection to guarantee their maintenance in a healthful state, thus practically insuring both landlord and tenant against unsanitary conditions of their houses. The terms upon which the Health Corporation propose to act are so moderate that no sensible landlord should omit to avail himself of the invaluable assistance offered by the corporation; while no person who values his health and that of his family should become the tenant of a house unless he is first of all placed in possession of a certificate as to its sanitary condition, to be guaranteed subsequently by periodical inspection. The Company has a strong board of directors, and its consulting staff includes a number of gentlemen of high standing in their respective departments.

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### Dietetic Notices.

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SWINBORNE'S PATENT REFINED ISINGLASS.—If we strictly adhered to the suggestion conveyed in the proverb, "Good wine needs no bush,"\* there would be no occasion for this notice, for Messrs. Swinborne's refined isinglass has for many years held the first position in the market. But the excellence of any preparation always leads to imitations of an inferior character, so that it is well from time to time to warn purchasers against imposition and disappointment. As long ago as 1849, Professor Brande, F.R.S., lecturer on chemistry at the Royal Institution, reported that the result of a careful analysis of Swinborne's isinglass and the best Russian isinglass was to demonstrate the superiority of the former "in all

\* In olden times, it was the custom to suspend a bough, or bush, over the doors of houses where wine and the like refreshments were sold. Hence the proverb, implying that people will find out a good article without any special invitation to enter the shop where it is to be had.

respects," whether as regarded its freedom from colour, taste, and smell, its complete solubility in hot water, or its strength, firmness, and durability. After the lapse of the greater part of half a century, Professor Brande's report so exactly describes this preparation that it might have been dated March 3rd, 1891, instead of May 3rd, 1849. Swinborne's gelatines are also of the highest quality. Messrs. Swinborne publish at a nominal price a very useful handy guide, called the "Pastry-cook and Confectioner," containing numerous recipes for puddings, pies, jellies, and other table delicacies. The directions for making clear lemon jelly are specially excellent, and the product is both better and cheaper than wine jelly.

## Correspondence.

### CHEAP FOOD, OR WANT.

*To the Editor of HYGIENE.*

SIR,—With reference to the letter in the February number of your paper, by Mr. J. Lawrence Hamilton, M.R.C.S., under the above title, I would remark:—

(1) That, speaking from five years' experience, I find that a non-flesh diet is far superior to the ordinary, or fish, flesh, and fowl diet. I have tried it both with sedentary work and also while employed as a traveller, enjoy the best of health, and experience a clearness of intellect and strength of brain-power much in advance of what I formerly possessed as a "mixed feeder."

2. "Excessive tendencies to alcoholic drinks and tobacco" are, alas! not confined to the poor, and are, food reformers claim, to be got rid of by giving up animal food and the use of white bread. Anyone desiring reliable information upon the subject may refer to the Vegetarian Society, Manchester, or to the London Vegetarian Society.

My food does not cost me more than 2s. 6d.

per week, and the necessary amount of nourishment, in a palatable form too, could be obtained for very much less, if necessary.

Moreover, by the adoption of this diet on a large scale our agriculturists would recover from their present depressed condition, and people would be drawn from the towns, instead of being driven there, as at present.

Trusting you will find space for this,

I am, Sir,

Yours obediently,

R. R. SAUNDERS.

13, Stormont Road, Lavender Hill, S.W.

P.S.—My diet has for some time been as follows, viz:—

*Breakfast.*—6 oz. bread, 2 oz. figs or dates, 2 oz. oatmeal, hominy or maize, as porridge, the fruit stewed and eaten with the bread, the liquor taken with the porridge, or 4 oz. figs or dates dry, and 2 oz. nuts (pea, or monkey nuts, baked, or Barcelonas), and 3 oz. bread.

*Lunch.*— $\frac{1}{4}$  lb. bread or biscuits, and an apple or orange.

*Dinner or Supper.*—2 oz. haricot beans or lentils, boiled, 8 oz. potatoes, carrots, etc. (or a soup composed of above), and a plain rice or other pudding, or macaroni cheese or rice and cheese, and 4 oz. bread with jam.

The weights stated of cereals and legumes are before cooking.

The cost comes out thus per week:—

	s. d.
Bread, 5 lb., at 1 $\frac{1}{2}$ d.	.. 0 7 $\frac{1}{2}$
Figs and dates, 2 lb., at 2d.	.. 0 4
Nuts, 1 lb., at 3d.	.. 0 3
Fruit for lunch	.. 0 4
Haricots and lentils, four days, 8 oz.	0 1
Pudding, four days	.. 0 4
Vegetables	.. 0 2
Macaroni or rice cheese, three days	0 4 $\frac{1}{2}$
	<hr/> 2 6

I calculate that I consume about 32 oz. per diem, giving 4 oz. nitrogenous, 14 oz. carbohydrates, 2 oz. fat, and 12 oz. water, exclusive

of what I drink. Whole meal bread is the only kind I use, and I find the "Hygienic" the best, being made with finely-ground meal and a minimum of salt.

It will be observed that I eschew tea, &c., my drink, when I need any, being water, generally hot, before going to bed.

I work hard, have much walking, and weigh 18 lb. more than before giving up meat.

R. R. S.

## Notes and News.

TAXES ON THE DISSEMINATION OF KNOWLEDGE are fewer than they were, but there are some indirect ones, owing to the faulty state of our postal system, which urgently need remedy. Take the case of HYGIENE for example. If this periodical were published weekly, the charge for transmission through the post-office would be only a halfpenny for such copy; as it is a monthly publication the cost is doubled, namely, one penny. On a few copies this extra charge would, of course, be a matter of little moment, but when many thousands of copies are sent by post annually, the impost becomes a serious tax, involving scores of pounds. In other words, we are taxed more than £20 for every ten thousand copies posted, because HYGIENE is a monthly and not a weekly publication. Nor do the injustice and injury end here. In some instances the impost is a tax upon industry, and a hindrance to business. It has not unfrequently happened since the establishment of HYGIENE in 1887 that gentlemen interested in various articles of important character have purchased from 1,000 to 5,000 copies for their own private distribution. Unless previously informed that the rate of postage is higher than it would be if HYGIENE were a weekly publication, they have been annoyed by having many copies returned as insufficiently stamped. We are constantly in receipt of complaints on this subject from sub-

scribers, who, wishing to bring articles to the knowledge of their friends, have posted copies to them, merely putting the ordinary newspaper postage stamp of a halfpenny on the wrapper. The unfairness of such a condition of things needs no comment. We are glad to say that there is now a chance of its being remedied. Our well-known contributor, Mr. Jabez Hogg, brought it under the notice of the indefatigable and vigilant postal reformer, Mr. Henniker Heaton, M.P., who has recently intimated to us his intention of specially dealing with this anomaly in the postal reform measure which he and Mr. Howard Vincent, M.P., propose to submit at an early date to the House of Commons. Anyone who thinks the existing postal system to be perfection should read the remarkable article on this subject by Mr. Henniker Heaton, published in the March number of the *Contemporary Review*.

ANY EXCUSE IS BETTER THAN NONE must be the reason why a baker, who was recently summoned for selling bread of deficient weight (his 4 lb. loaves weighed scarcely 3 lb. 5 oz.), gave as his excuse that he had been trying for many years to make his bread lighter than that of anyone else in the trade.

THE HOUSE OF COMMONS is protected from fog by the following method, which is both ingenious and expensive. The air pumped in from the river terrace is forced by steam fans through thick layers of cotton wool, which retain all impurities, leaving the air in a state of great purity. The layers of cotton wool are 6 inches in thickness, and occupy an area of 800 square feet.

THE LOW AMOUNT OF RAINFALL in England during the present year has been notified from all localities. Even after the welcome thaw terminated the long frost of 1890-1, rain was recorded in few localities, and then only much below the average. A correspondent, writing from Molesey, informs us that between January 31st and the first week in March none fell;

the one-tenth of an inch of moisture measured during that period being due to deposition by the occasional fogs.

**RATIONAL DRESS FOR LADIES.**—The Women's National Council at Washington, U.S.A., have appointed a committee to furnish a report within one year of the present date on the subject of a business costume for women, meeting the demands of health, comfort, and good taste. We may mention, for the information of our new subscribers, that an excellent article on this matter appeared in No. 36 of HYGIENE (December, 1890.)

**HIGH-PRICED TEA.**—Not long ago we recorded in our columns the sale of a small parcel of Ceylon tea at an unprecedentedly high price, but that has been completely put in the shade by the price, £10 12s. 6d. per lb., which a parcel of Gartmore (Ceylon) tea fetched at an auction at the Commercial Sale Rooms, Mincing Lane, on March 10th. It is described as possessing special quality and "liquor," and as being composed entirely of small golden tips which are the extreme ends of the succulent shoots of the plant. The production of such tea is very costly. The *Daily News* suggests, with reference to this sale, that we seem to be entering upon a tea mania resembling the tulip mania of a former generation.

**TOBACCO.**—The value of tobacco imported into this country in 1890 was £3,542,949, while the amount of duty paid was £9,572,747, and the quantity remaining uncleared in the bonded warehouses on December 31st, 1890, was upwards of 132 million pounds weight. It is difficult, in face of these facts, to understand the arguments of persons who think that tobacco might be more highly taxed than at present.

**THE SEVENTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY** promises to be a great success, and to bring permanent benefit by the diffusion of sound sanitary knowledge and stimulating the public interest in sanitary

affairs. At a recent meeting of the General Committee, the Prince of Wales, as President of the Congress, occupying the chair, important progress was made in the arrangements for the meeting to be held in August, from the 10th to the 17th. The honorary secretaries are Dr. W. H. Corfield and Dr. G. V. Poore; and the offices of the Congress are at 20, Hanover Square, W. We learn from a recent exchange copy of the *Rivista Internazionale d'Igiene* that Professors A. Mosso and L. Bodio, Director-General of Statistics, have been appointed to represent Italy at the Congress.

**NATIONAL HEALTH SOCIETY.**—At the annual general meeting, held last month, Mr. Frederick Treves in the chair, the secretary's report was read, and unanimously adopted, as showing a considerable increase in the work and usefulness of the Society. The Society is now arranging for the delivery of courses of lectures for the poor at fifty different centres throughout Devonshire, at the request of the Technical Education Committee of the North Devon County Council.

**PROTECTIVE BOUNTIES AND ADULTERATION.**—One of the first results of the bounty offered by the United States Government for the manufacture of sugar from native products has been a great increase of adulteration. Bounties are promised for all sugars of certain specified sweetening powers made from beet, sorghum, sugar cane, or maple sap. In order to obtain the higher bounty it is alleged that producers are adulterating their syrup with common brown sugar, glucose, grape sugar, and sugar produced from maize.

**DWELLINGS OF THE POOR.**—The Mansion House Council on the Dwellings of the Poor, of which the Lord Mayor is the president, held its monthly meeting at the Mansion House on March 11th. Mr. John Hamer, the honorary secretary, read the report of the month's work, from which it appeared that insanitary houses had been inspected and reported to the local

authorities in Lambeth, Camberwell, Mile End, Southwark, Fulham, Bromley, Limehouse, Clapton, Marylebone, Islington, Bethnal Green, Clerkenwell, Westminster, Shoreditch, St. Pancras, St. George's, Hanover Square, Kensington, Greenwich, St. Luke's, and Chelsea. The invitation to working people to co-operate by reporting insanitary conditions had been cordially responded to, and about a hundred cases had been received at the central office during February. It was resolved to ask the assistance of the various clubs and societies in memorialising the Local Government Board in favour of the establishment of a register of landlords in the metropolis, to be kept for reference at each vestry. A resolution was passed in favour of the Bill before Parliament for the abolition of the property qualification for vestrymen. Leaflets on the water question, fresh air, and ventilation, &c., were ordered to be printed and published. It was resolved to move in the direction of getting a clause inserted in the Bill for consolidating the Sanitary Acts enabling the County Council to frame bye-laws for securing adequate open space around new buildings.

"HONEST WATER," of which Shakespeare wrote, would be ashamed to admit any relationship with the questionable fluid supplied to five and a half millions of people in London and the suburbs from the Thames and the Lea, and described so graphically in Mr. Jabez Hogg's article in the present number of *HYGIENE*. Yet, the great monopolist water companies are looking forward to enormous purchase-money. Instead of committing such a monstrous blunder as thus perpetuating the Thames water supply, the authorities should direct an inquiry as to other and pure sources whence the metropolis can, in future, obtain the first necessary of health and life. This is a matter which closely concerns every resident of London and the surrounding populous districts, and it cannot be too strongly urged upon all to give it their most earnest attention.

**INFLUENZA IN THE UNITED STATES.**—From a telegram dated March 26th, we learn that this epidemic prevails to such an alarming extent that in Chicago alone the death rate has increased to 150 daily. From Pittsburgh 10,000 cases are reported, and from Cleveland, Ohio, 2,000, while in New York 160 policemen are on the sick list.

**A TIMELY PRECAUTION.**—The Pope has granted Roman Catholics in the diocese of Rome a dispensation from fasting during Holy Week owing to "the probability of a fresh outbreak of influenza in Rome this spring."

**UNSOULD MEAT.**—There were 29,714 lb. of unsound meat seized during February in Edinburgh.

**FUNGI.**—Dr. M. C. Cooke, a great authority on fungi, states that there are 4,600 known species of mushrooms and toadstools. Of these, 1,400 are found in the British Islands; but of the total number only 134 can be relied upon as edible.

**TEST FOR ADULTERATION OF BUTTER.**—Sulphuric acid is a simple but certain test. Fresh, pure yellow butter, upon being brought into the strict contact with sulphuric acid, turns to almost a pure white, while butterine, made from animal fat, changes to a deep crimson red. When lard or other oils are used, the colours are diversified, and show all the tints of the rainbow.

**AMBULANCE CLASSES.**—The directors of the North-Eastern Railway Company have agreed that when any of their servants obtain the ordinary certificate of the St. John Ambulance Association of efficiency to render "first aid" to the injured, the Company will pay their class fees. Classes for ambulance instruction are organised at many of the Company's stations and workshops.

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## EXERCISE AND ATHLETISM.

### USE AND ABUSE.\*

By R. CLARK NEWTON, L.M., C.M., M.R.C.S.

In addressing you to-night on "Exercise and Athletism," I do not for a moment lose sight of the fact that the subject might well occupy half a dozen lectures instead of one, and that therefore I shall be compelled to omit very much which is germane to the subject, and with which every man and woman ought to make themselves acquainted. But I shall endeavour, in the time at my disposal, to present such a view of the subject as will prove, I hope, both interesting and instructive.

It would be impossible to give, in a few words, anything like an exact definition of what is meant by physical exercise. But for our present purpose it will be quite sufficient to define it as the use of the voluntary muscles of the body as contrasted with pure brain-work or mental exercise. In reality, of course, there is no physical exercise without brain-work; but we all appreciate the difference between sitting at a desk reading, writing, or calculating, and walking, running, or leaping. Well then, taking physical exercise to mean the use of our voluntary muscles, it will be necessary to touch very briefly upon the

anatomy and physiology of the muscular system.

You know that the skeleton forms the framework of our body, and that it is clothed with masses of flesh known as muscles. These muscles make up so much as two-fifths of the entire weight of the body. They are the organs which effect all the external movements of the body: we cannot bend a finger, raise an eyelid, or smile, without calling them into play. They are the lean and red flesh of the body, and though they seem to exist in one mass, yet each is really divided from its neighbour by tissue, and they are all duly supplied with blood-vessels and nerves. I may mention, *en passant*, that there is another form of muscular tissue found in the walls of the stomach, bowels, and coats of the blood-vessels, lungs, and elsewhere. This variety is known as involuntary muscle. When the idea of walking occurs to us, we "will" the action of the necessary muscles; but the involuntary muscles by which the movements of the stomach, heart, lungs, etc., are affected, go on with their work whether we "will" it or not. Such a provision is imperative during sleep and work; for if a man had to control the internal work of his body, it is certain that it would be constantly neglected amidst the engrossing concerns of life. When we reflect how man abuses and mismanages his external muscles you will agree

\* A lecture delivered to the members of the Health Society, Newcastle-on-Tyne.

with me that he is absolutely incapable of taking charge of those that are concerned with the mainsprings of his existence.

Each muscle contains hundreds of fibres made up into little bundles, and the whole is wrapped up in a tough sheath, and this sheath is thickened at each end so as to form a tendon or leader, which is attached to the part it is to act upon. Now, how does a muscle do its work? By contracting—that is, becoming shorter—and thus bringing the movable parts to which it is attached nearer each other. I have mentioned that muscles are supplied with nerve power, and it is by nervous action that they are usually started into activity, though they may also be made to contract by the mechanical prick of a pin, or an electric current, or by heat, or by the application of various chemical substances.

Now here is a curious fact—the power of a muscle is within itself; it is a store-house of energy; and when it receives its stimulus from a nerve, the nerve is only concerned in liberating the pent-up energy of the muscle. There are some very complex processes constantly going on within each muscle—chemical changes allied to combustion. They are constantly absorbing and using up oxygen, and liberating carbonic acid gas, and this chemical change produces heat just as surely as when we burn coal or wood. You will readily see that when the muscles are in active use the development of heat will be in proportion to their activity. But the chemistry of muscle presents another interesting feature, for it is found that after contraction some free acid has been developed—viz., paralactic and phosphoric acid. Now if we dissect out, after death, the muscle of an animal—say a frog or a rabbit—we can still cause it to contract by stimulating it with an electric current; and the same chemical changes can be shown to take place as when the animal was living. Evidently then the chemical changes take place in the muscle and at the expense of the muscle substance; and muscular action is akin to respiration, in that

we have the production of heat, the absorbing of oxygen, and carbonic acid and water as waste products. If waste is going on we must have some provision for the removal of these effete matters, and a corresponding necessity for some means to supply material for repair or nourishment. And we find that these desiderata are duly supplied, for every muscle is provided with arteries which convey to it blood charged with food and oxygen, and veins to conduct the waste material away; and under the microscope the arteries going to a muscle, and the veins leading from it, can be seen greatly distended when stimulated to activity. We know now how to account for muscular fatigue resulting from excessive exertion—that wearied, aching sensation that forbids another step to be taken after a sharp and continued effort: it is because the muscles have been denied time to repair themselves, whilst they are choked by the products of their own disintegration.

Looking upon our body as a machine, it is a law of Nature that if we are to maintain good health all our organs must enjoy periods of rest as well as of activity; even the heart rests nearly half its time, beating and resting, and so on alternately, resting and beating. We cannot stay to consider, so far as our muscles are concerned, whether too much rest or too much activity is the greater evil; but our glance at the subject will indicate that muscular rest and activity are both necessary to ensure muscular health; and from what we now know can we wonder that muscular use means unusual muscular bulk, whilst disuse ends in wasting?

So far I have spoken chiefly of our muscles, and as if the effect of exercise ended there; but let me ask you to call to mind the enormous number and bulk of the muscles, and so lead you to the contemplation of the effect that extensive muscular exertion must have on the whole of the system. I have spoken of the arteries and veins that are connected with each muscle; but these in turn form a part of the

general blood circulation, so it follows that active exertion, such as running or rowing, will increase the general circulation, and the call for more blood and food for muscular repair will start into functional activity the other organs of the body, notably the heart, lungs, liver, skin, and kidneys.

Suppose, now, I form the resolution to leave this room and walk briskly along the street. I telegraph my resolve along the nerves that supply the muscles of locomotion, and instantaneously they are set in motion, and the effect of this will presently be evidenced in the heart's beat which will be more rapid and stronger<sup>2</sup>; this increased pulsation will produce a feeling of warmth, and soon an increased moisture of the skin. The whole circulation will be accelerated; good blood will be hurried to every nook and corner of the body, and the venous system will be actively engaged in conducting away the waste products; more blood will be passed through the lungs, so respiration will be increased; the rise and fall of the chest will be augmented, and the muscles of the chest will be strengthened. If I walk at the rate of five miles an hour I shall pass one hundred and thirty gallons of blood (or thereabouts) through my lungs, and in breathe for the purification of this blood about one hundred and seventy gallons of air. To put it in another form, I shall pass every drop of blood through the lungs once every two minutes. Thus you have brought home to you the fact that the effect of exercise is more than mechanical; it means increase of chemical and physiological activity, and the quickening of all the vital powers.

The effect of exercise upon the digestive organs is most marked, and it is quite impossible to preserve good digestion without it. It quickens the appetite and enables us to eat animal and fatty foods. But there is a time for everything, and it is of importance to note that exercise should not be taken soon after food, and for this reason: Nature is not able to keep two classes of important functions in vigorous

operation at the same time. Thus during exercise the blood is diverted from the stomach to the muscles of locomotion, and the stomach is more or less starved or cheated out of its blood supply in proportion to the violence of the exertion. Two greyhounds were given a hearty meal; one was hunted immediately afterwards, whilst the other was confined to a courtyard. In a few hours the animals were killed and the contents of their stomachs examined. In the first case digestion had scarcely begun; in the other it was almost completed. The best time to take exercise is about two hours after a moderate meal; if delayed much longer than this it is apt to produce exhaustion, and impairs rather than improves digestion. It seems, then, that the principal meal of the day should be fixed at an hour when the calls of business or pleasure are not likely to intrude upon digestion.

Now we come to the important question: How much exercise should a healthy man take each day? To arrive at this we must take into consideration the daily expenditure of force or power in the ordinary working of the human machine, and the amount available for extraordinary effort. The amount of force daily expended by a man weighing 150 lb. is estimated at 3,400 foot tons—*i.e.*, the power to lift 3,400 tons one foot high. So much as 2,840 of this is required for the purposes of maintaining the heat-producing energies, and 260 in the supply of nerve-power, by which such internal functions as digestion, secretion, etc., are supported, and the remaining three hundred are at the individual's command for muscular work. These quantities vary with the individual, but averages have been taken of the energy expended in the performance of certain work; thus walking one mile would equal 17.67 tons lifted one foot, and rowing one mile in an outrigged eight-oar 18.56 tons raised one foot. With a stock of 300 tons of power at command for each day's external muscular work, it will be seen that the amount of such expended in a boat-race is trifling indeed; nor is its rapidity of expendi-

ture of any great importance in a short distance ; but if the race covers five miles, that is  $18.56 \times 5 = 92.80$  foot tons, then the rapidity of expenditure becomes really important, though other things being equal, it is still not wholly out of proportion to the amount of force at command. I say at command, for the athlete should know that when he borrows from his own bank by strain, when he serves a distress warrant upon his own system, he may be like many borrowers, never able to repay the loan.

Although an average man in good health, and accustomed to "earn his bread by the sweat of his brow," has the power to daily raise one ton to the height of three hundred feet, yet this is a hard day's work for anyone not engaged in manual occupation ; and it would be safe to say that the ordinary man would only be equal to performing the half of this work each day, viz., 150 feet, and it is calculated that this amount of work would be represented in the effort required to walk nine miles on level ground. But suppose we expend in moving about the house or office a force that is equal to walking two miles a day, still we have a balance of seven miles a day to utilise, and this represents the amount of exercise that should be daily taken by every healthy man. You will observe I have spoken of the average healthy man ; but it must be noticed that exercise must be proportioned to the individual's health and strength. What is but gentle and pleasant exertion to one man may be actual destruction to another, and individual fitness for walking or playing tennis or football depends not only upon a man's lower limbs, but also upon the condition of his heart and lungs.

A large section of the public are engaged in sedentary occupations, and many a merchant who day by day does little more than walk to and from the office or shop hails with delight the advent of a public holiday, and seeks on such an occasion to compensate for his previous inactivity by spasmodic exercise. He will walk his ten to twenty miles perhaps. Another

engaged in business all day seeks by violent boating, tennis, running, or dumb-bell exercise in the evening, to improve or maintain his health. Now the exercises mentioned serve the purpose intended admirably if used with discrimination ; but unfortunately many endeavour to make "speed" accomplish what should be attained by "time." In mechanics the engineer often substitutes speed for time. But the result is vastly different when we attempt to strengthen muscle and improve nerve-tone by a rapid "spin on the river," or a "good go at the dumb-bells," or a "bursting run." Exercise, to be permanently useful, must fall short of exhaustion, and be extended over a long period —that is, it must be regular rather than spasmodic. Everybody so placed would do well to ponder what Dr. McLaren says on this point :—" But even when these holiday breaks are made most sensibly, they must not be regarded as the all-in-all of the exercise to be taken. A man cannot in a week or two eat sufficient food to supply the demands of appetite for a year, neither can he take sufficient exercise to keep his body in health throughout the four seasons in a summer ramble. These mountain excursions or seaside sojourns must be *in addition to*, and involving no curtailment of, the daily walk to and from business, the daily ride to somewhere, or the daily employment with or at something ; a something which in its doing will quicken the pulse and augment the breathing, and, if possible, bring the perspiration to the forehead."

Exercise may be favourably connected with other agents of health, such as bathing, the practice of swimming ; and with fresh air, as in the country ride or ramble. To men living in large cities—the men, of course, whose need of exercise is greatest—it seems but a tantalisation to recommend a country ramble ; but there are a great many men pining for want of proper exercise who do not live in large cities ; and there are a great many others who spend but a portion of their time there, with whom an

occasional ride along the green lanes in the saddle, or across the meadows on foot, would be a matter of easy accomplishment. Men do not know what they possess in these cross-country roads, and in the power to traverse them on foot—the pleasure—the profit of walking—the first exercise enjoyed in life, the last that is freely taken. But the walk to be really enjoyable must be a country walk—the antithesis to the “constitutional” of a measured mile on a dusty road—going where fancy prompts and inclination leads, forgetting alike past mental mental labour and present physical effort in the successively recurring objects of interest that will arise at every turn of the path.

Having wandered with you leisurely in thought through these cross-country lanes, let us return and consider some of the evils resulting from spasmodic exercise and the injurious effects of violent athletics. We first note that under great exertion the respirations are increased from the normal eighteen per minute to perhaps forty. In rowing at the rate of thirty-seven strokes per minute the respiration will rise from eighteen to forty per minute. The rower must breathe quicker, so that he may take in enough air to purify the enormous quantity of blood that is rushing through the lungs. It is thus apparent that a great extra strain is thrown upon the heart and lungs whenever a great physical effort is made—a strain out of all proportion to what those organs are called upon to bear in everyday life. But we have seen that, so far as the muscular system is concerned, the exertion of boat-rowing does not overstrain the power at command; and this applies to all similar athletic exercises, such as football, tennis, etc., where the pace may be rapid, and in all such the detrimental effect arises from the inability of the lungs to keep pace with the heart’s excited action; hence the “loss of breath” and the “stitch in the side” so commonly complained of. And thus we are brought face to face with one of the evils of unintelligent training—viz., the

excessive cultivation of the muscular system and the ignoring of its effects on the heart and lungs. And thus it happens that in racing, or in any game where space is an important factor, many a man breaks down *not* from want of skill, style, or muscular strength, but through failure of the circulatory or respiratory organs. The individual with or without the help of a trainer has sedulously cultivated his muscles, but inadequate attention has been paid to the limits of endurance of his heart and lungs. Hence, when the athlete makes his effort or his “sprint” with his hard and well-developed muscles, a strain is put on his heart and lungs which, in a well-trained man, is satisfactorily met. Otherwise, something must give way: very often the air-cells of the lungs become ruptured or expanded, and a lifelong disease is produced—the man becomes “broken-winded”; or if the lungs do not give way, perhaps dilation of the heart occurs. In another man the dilation may be in the coats of the *aorta*, the great artery that leads directly from the heart, forming what is called *aortic aneurism*; the artery, instead of remaining a tube as in health, becomes dilated at some part, and in the course of time, the pouch, slowly expanding, ultimately bursts, causing instantaneous death. Again, we sometimes see *enlargement* of the heart: the heart is a forcing pump, and has to keep the blood in circulation: the work it has to do in health is enormous: it makes about 100,000 strokes every twenty-four hours, and forces along 20,000 lb. of blood during that time. Now you will see that a man in training, or otherwise subjecting himself to great exertion, keeps his heart contracting and working with a greater force and frequency than ordinarily, and that organ, in endeavouring to perform its increased work, becomes enlarged or hypertrophied. The heart becomes, in fact, stronger; its muscular structure, like that of the limbs, is developed, and *for a time* the trained athlete presents, with his muscular build and strong heart, a picture of what a man

should be. But all this development has been attained by injudicious and artificial means, and when training is discontinued the external muscles diminish in size and power; but a heart, having once become enlarged, remains so permanently. The patient feels his heart beat, perhaps all over his chest, and he hears it plainly on lying down. The future of such a patient is usually unfavourable. *Fainting* is another consequence of over-exertion, and calls for much care; it is a note of warning that must not be disregarded. *Then* there is that sudden and transitory loss of power in which the patient does not entirely lose consciousness; it, too, calls for wise treatment and the abandoning of all ideas of athletic glory. *Emphysema of the lungs*, or rupture of the air-cells, has already been mentioned: its signs are shortness of breath, especially after exertion: the complexion at times becomes more or less dusky, and it may be accompanied by cough and expectoration. This affection is often mistaken for indigestion, and requires prompt cessation from violent exertion. Several other results of excessive physical exertion are observed, such as tremor, rupture, enlarged veins, boils, etc. But time prevents my dwelling any further upon this dark side of athleticism.

Formidable as the diseases enumerated are, it is comforting to know that none of them need necessarily originate under training or exercise, if ordinary care and discretion are observed. Trainers are apt to forget that all men have not the same constitution, and they often expect all under their care to attain a certain standard reached by their former pupils, or known by tradition; whilst the public expect from each new aspirant to muscular fame a performance above the average—"record" must be broken. Dr. McLaren insists on what he aptly terms "individual fitness" being taken into consideration under such circumstances; and he lays down clearly the important principle "that what is scarcely exertion to one person

will be dangerous and injurious to another. And not only is this inequality observable among different individuals, but, as we have already seen, the same individual may have parts of his body possessing special power, or presenting special weakness. A man may have limbs capable of transporting him at the rate of four miles an hour throughout the day, and for many days in succession, but with heart and lungs all unequal to the effort; or he may have an organisation so frail, and a temperament so susceptible to stimulus or excitement, that the one is an abiding danger to the other. You will all agree with me that exercise or training can wonderfully develop the system and its powers, so that exercise that was once irksome becomes a pleasure; but you must also have observed how different individuals vary in capacity to sustain energetic action: some bear the strain for a long period, but if strained, then, sooner or later, the powers fail, and disease is developed."

Now let me briefly refer to some forms of physical exercise. We must give the first place to *Walking*. It is the most natural and the cheapest, and it has the advantage of calling into action almost every muscle in the body. But do not walk like a soldier at "attention," and, though it may be ungraceful, swing your arms and body, otherwise the muscles of the trunk and arms will not fairly participate in the activity being enjoyed by your lower limbs. Hold up your head, too, and leave your stick at home unless you are an old man. The use of a stick in walking will hasten the time when you can't hold up your head.

*Riding*.—Much may be said for and much against riding, but it may be summed up in a general way thus:—Ride to regain health, walk to maintain it. Riding causes less fatigue to the lower limbs, so that a weak person can use his horse when either debility or disinclination would prevent him walking: he can when weak go at just a walking pace, and when his strength returns he can dash along at full gallop. It is

peculiarly useful to the middle-aged whose business is sedentary, and to all such as are dyspeptic, and have livers that require shaking.

*Rowing* is wonderfully popular in England. In summer crowds of people flock to our rivers and sea-coasts for indulgence in this exercise, though I fear football has of late claimed the attention of many rowers. It is practised by some as an art or profession, and by many as an exercise. I have not time to dwell upon rowing as a profession, and show you some of its defects; but I will point out to professionals and persons who do much boating that it has the disadvantage of giving active employment to the muscles of the back, hip, and legs, whilst the muscles of the chest are neglected, and the muscles of the arms and back do more work than those of the legs. Now it is a law of healthy exercise that if we develop a certain group or groups of muscles, the neglected muscles degenerate in proportion as the exercised ones develop. Boatmen should therefore adopt some complementary exercise, such as walking or running, to develop the neglected parts. Now, as an old boatman once remarked, "The crew that can bucket it the fastest will win the race—if they don't burst," and as I have already pointed out that many boat races are lost because the respiratory powers have not shared in the training, you will see why walking and running are recommended as an additional exercise to persons boating.

*Dancing* is a natural and graceful exercise that may be safely and beneficially indulged in by the young and middle-aged. It is urged that the conditions under which it is practised are objectionable—hot rooms, bad air, and late hours. Remove or mitigate these drawbacks, and dancing, looked upon as a healthy exercise, is to be highly recommended. I have nothing to say here as to its moral aspect, but I may point out that its health-giving properties are not a little enhanced by the stimulation it gives to our hearts and heads. Think how it is entwined with ancient and modern history, with

the crowning of both civilised and savage kings, with festivities and rejoicings of all kinds. How it flows side by side with music and the dramatic art, and how it has been, and is yet, made to portray love scenes, stirring historical events, &c. We are not a dancing nation. See how the natives of Java can in dance delineate "The Rising of the Waters," "The Tempest," or "The Saving of the Princess," and compare this with the tale we mean to act when we dance the modern quadrille.

*Cricket* was once our national sport, but now it is hardly pressed by golf, tennis, and football. As a mental and physical exercise combined, it is difficult to supersede. For school-boys it has no equal, and a boy of seven may be entrusted with his bat if he plays with lads of his own age; and it has this advantage, it can be taken up and played without that preliminary training required in boating, running, or football.

*Golf* is increasing in popularity, and it is *the* game for the middle-aged and weak; it is played alike by men and women. There is just enough head power expended over it in estimating distances and graduating force to make it intellectually interesting, without being fatiguing to brain-workers, whilst the exercise is so gentle that the aged and infirm may have little fear of exhaustion or the development of disease.

Perhaps *Cycling* has grown into popularity more quickly than any other physical exercise ever introduced. What a huge army of followers it has, rendering it necessary to have several weekly papers devoted to their interests, and maps and books describing every highway and byway in the kingdom. Dr. Cantlie has calculated the expenditure of energy in the driving of the bicycle. He has used Professor Joulis's method, by which you will remember it was calculated that a man has 300 foot tons of energy at his disposal daily; and Dr. Cantlie comes to the conclusion that from his actual observation of the effects of comparative distances travelled, it is plain that to travel a mile

on a bicycle is equivalent in muscular expenditure to about one-sixth of that expended in walking a like distance. The exertion spent in travelling a mile on the "level" is not more than 4 foot tons. So that, as 300 foot tons is the calculated amount of daily exertion necessary to keep a man in health, an eighty mile ride can be undertaken by a man without danger of over-doing it. No road, however, is level or smooth; hence it is nearer the truth when the exertion expended is considered to be 6 foot tons a mile, limiting the distance which ought to be travelled to less than sixty miles a day, if one is to keep within the bounds in regard to the energy expended. Of course, a healthy man can do more than 300 foot tons a day, but an exertion greatly over that amount cannot be continued day after day without injury to health.

And he further calculates that forty miles a day is about the maximum distance that ought to be done on a tricycle, and at a rate of not more than six miles an hour. So if judiciously used the cyclist can in a few minutes be out in the open country combining fresh air with his exercise; and here, owing to the various scenes through which he passes, the cyclist has an intellectual relaxation moving hand in hand with physical regeneration. Every form of exercise is detrimental if pushed to excess—even so gentle an exercise for the muscles as writing may end in "writers' paralysis"; and because some youthful cyclists aim at "beating the record," or indulge in "spurting" and racing, and suffer thereby, it does not follow that the multitudes of older and more discreet cyclists need abandon an exercise that affords them pleasure and endows them with a wealth of health. I have conducted for many years a fairly large general practice in a district where cycling is certainly extensively adopted, yet I have scarcely ever met with a patient permanently injured in this way. My experience may have been exceptional, but I state it as it exists; but, on the contrary, I have advised the use of cycling to

hundreds of patients, who one and all have derived the greatest benefit from its adoption. At the same time, I think growing lads, and persons with weakly constitutions, or all such as have any heart or lung affection, should not rush to this form of exercise without medical sanction.

*(To be continued.)*

### A PLEA FOR TOTAL ABSTINENCE.

By DR. A. J. H. CRESPI, Wimborne.

THE portentous increase in the drink bill in the past two years, an increase amounting to nearly £15,000,000, and bringing up the annual expenditure to nearly £140,000,000, calls for careful consideration. It has often been contended that the decrease in the national drink bill, which went on for a dozen years, was due to depression of trade, and not to the spread of temperance principles. It was even said that the labour of temperance reformers had not done a particle of good, and that the diminished consumption of alcoholic stimulants could be accounted for in ways with which their labours had nothing to do. However this be, the ominous fact cannot be gainsaid that the national drink bill is immensely too large, and that intemperance continues to cause and to aggravate suffering and crime to a degree that appals everyone who seriously approaches the contemplation of the matter. It is not necessary to be a total abstainer to admit this. From the episcopal and the legal bench, from Parliament, from medical observers, from the press, and the reviews, the protest is heard that far too much is spent on alcohol, and that were the bill to fall to £40,000,000 enough would be obtained to satisfy the reasonable wants of the nation. To a lifelong abstainer like myself it might be possible to go much farther, and to argue that there is no compensating advantage in the most temperate use of alcohol. Be this as it may, however, I feel that no apology is due to my readers for the present article, and

that I am fully justified in dealing with the matter candidly and plainly, without the remotest reference to the political and religious views and side issues which so many temperance advocates allow themselves to be influenced by. I have to deal with facts, not with theories; the growth of true temperance is my sole subject, not dealing a blow at any religious or political party.

The editor having with great impartiality permitted me to explain the position which a medical total abstainer feels justified in taking in regard to this question, I enter on a task the justification of which lies in the grievous misconceptions with which scientific temperance is still commonly regarded. The opinions of teetotal doctors on the platform and in the press have, of recent years, often been mercilessly criticised, and it is common enough for their efforts for the general good to be wholly misunderstood; this must be so as long as their methods are not fairly grasped. Why should this ignorance prevail? No medical practitioner who appears on the temperance platform should be accused of having anything to gain therefrom; such work is almost invariably gratuitous, at least so far as he is concerned; and generally and in consequence as it were of his philanthropic exertions on behalf of others, there is a falling off in the social position of his clients, while his professional income declines. In short, the well-to-do will not tolerate a teetotal doctor. Those who minister to the vices and follies of mankind, as Sir James Paget has so truthfully observed, are far more likely to reap a golden harvest than he who refuses to countenance what he believes to be wrong. The medical abstainer might at least be credited with being actuated by the loftiest, though possibly the most mistaken, philanthropic motives, and he ought to have a patient hearing.

Having attended hundreds and spoken at scores of temperance meetings, and having heard many of the foremost temperance advocates of the day, and having pondered over the

question—less to the advancement of my practice and prospects than, I humbly trust, to the benefit of the temperance cause—I hope that, without any appearance of presumption, I may claim to know something of the arguments of thoughtful abstainers; but with those of the ignorant herd of paid or illiterate agents and speakers I have no concern. As a preliminary, let me remark that the earnest but intolerant and illogical speeches sometimes heard on the temperance platform from good but ignorant men do not represent the opinions and methods of the more distinguished leaders of the movement, those who speak with authority, knowledge, and due reflection. I do not defend those speeches, although I contend that their extravagancies, however needlessly offensive to educated listeners, are not necessarily unmixed evils. They are, because of their very violence and narrowness, intelligible to many of the persons attending such meetings. Many a Churchman who detects a thousand inconsistencies in Methodist sermons admits that those sermons have done incalculable good, and are better appreciated by the peasantry and labourers, who mostly flock to Dissenting chapels, than would be the scholarly dissertations of Bishop Lightfoot and Canon Liddon, and the impassioned appeals of Bishop Boyd Carpenter. I remember the close attention with which I listened to Bishop Wilberforce, when, as a very young man, I heard him during my Oxford days, and I should have expected every thoughtful man to feel similar admiration for the great pulpit orator; nevertheless, I have known educated Dissenters, accustomed to the more forcible logic and plainer speaking of the chapel, complain that the brilliant Bishop of Winchester was uninteresting and monotonous. No educated man who has tried to interest an average temperance gathering, consisting mainly of very ignorant working-class people, can avoid noticing how imperfectly he generally succeeds, and his contempt for his hearers is not lessened when he listens to the

tumultuous applause which greets the noisy and coarsely witty declamation of some speaker whose ignorance and want of precision of thought and language permit him to rattle on for an hour, mouthing platitudes as though they were inspirations, and hazarding assertions that will not bear investigation. But the noisy temperance apostle is the more successful speaker. His aim is to keep obtuse working-men from the public-house, and to frighten them into living soberly and industriously, and he succeeds. Successful oratory is carrying one's point, and the speaker who accomplishes that is the better man. The objections so forcibly urged by the educated to temperance gatherings would vanish were they to take opportunities of listening to Archdeacon Farrar, Bishop Temple, Dr. Richardson, and—though I do not place him on the same level, nor would he admit the justice of the distinction—the Rev. Owen Luttrell Mansel, M.A., Rector of Church Knowle, Dorset. Mr. Mansel has studied the poor; he esteems and honours them; he lives among them, and he knows their capabilities and temptations better than do most of the clergy; and while his speeches are distinguished by earnestness and sound common sense, he avoids, from superior culture, extravagant assertions and misstatements. But, to his honour and to theirs be it spoken, no educated speaker commands larger and more attentive audiences in the south-west counties, so that it is possible, though unusual, for an educated man to address working-class audiences with success. The motives which influence Mr. Mansel are precisely those of Cardinal Manning and the late Samuel Bowly, of Gloucester. Has anyone ever detected fanaticism, intolerance, and exaggeration in the temperance utterances of the great Cardinal? Rather has he not seen in them the love of man, the earnest wish to diminish temptation, and to make life easier and loftier? The man is to be pitied who can come away untouched from the Cardinal's appeals. But it is not necessary that temperance speeches should be either coarse or

loud, or indistinguishable from sermons. Mr. Robert Sawyer, vice-chairman of the Church of England Temperance Society, and once well known as a successful and kind-hearted criminal lawyer, is in his way a grand fellow—genial, earnest, lively, and conscientious; no audience could complain that he is dull, none that his chief object is to amuse. Such men as Mr. Sawyer are the glory of the temperance platform, and redeem it from charges sometimes—and not altogether without foundation—brought against it.

The most powerful and remarkable exposition of temperance principles from a master of vivid description is to be found in “Danesbury House,” which is among Mrs. Henry Wood’s most successful works. Unfortunately for its wide circulation, its extreme moderation of tone, fidelity to life, and elegance of language are beyond the comprehension of most total abstainers. Moreover, the tone of temperance literature is lamentably feeble, and that of its periodical press low in an almost ludicrous degree, but there are exceptions. Cant and imposture, jealousy and rivalry, pervade every part of temperance work, and this may account for the low opinion which the influential classes have of a reform that, whatever the grievous faults and dissensions of its supporters, should command cordial and generous sympathy and help. It grieves me to observe how imperfectly the educated classes understand the motives, and follow the arguments of total abstainers. “Of all investments of time,” wrote Mark Pattison, “writing controversy is one of the most wasteful; your adversary is confirmed by what you say is his own opinion”; and perhaps my defence of total abstinence will strengthen the opposition of its enemies, and arm them with fresh weapons. No form of opposition is so effective, none withal so disingenuous and unworthy of thoughtful, right thinking opponents, as crediting an adversary with opinions he does not hold, and then exposing their fallacy. Nevertheless,

the hostility to total abstinence is not always captious and ungenerous. In many cases it is the outcome of ignorance, in others of garbled reports of third-rate speeches, and of loosely-worded papers, which have been put together with the best motives, but which no more do justice to the vital points at issue than would a schoolboy's rendering of Horace reproduce the spirit of the original.

We do not hold that it is wicked to drink a glass of ale, that the Bible inculcates total abstinence on all, and that the moderate drinker is worse than the drunkard. I have many times heard assertions that would bear such a construction from temperance speakers of a certain stamp, but I have regarded them with disfavour, and excused them on the ground of crass ignorance and intolerant bigotry. All the same, our position does not admit of clear exposition. Lawyers hold it to be opposed to the sacred traditions of English jurisprudence to build up an accusation of high treason on a number of weak charges—any one of which by itself would be insufficient to ensure a conviction—but which in the aggregate are made to appear overwhelming. This may be fair to the accused, but in matters of conduct we have to act otherwise, and a departure from the severe rules of logic is permissible. Men are often induced to take a certain course by putting together many weak reasons on the one side, and balancing them against a smaller number of still weaker on the other. In Cardinal Newman's "Apologia" there occurs a passage to the point ; he observes, "He who made us has so willed that in mathematics, indeed, we should arrive at certitude by rigid demonstrations, but in religious inquiry"—and I may add in politics, morals, and medicine—"by accumulated probabilities." Could we prove that Christianity commanded all men to abstain from alcohol, as it undoubtedly does from lying and thieving, could we show that in the smallest dose alcohol was a poison, like

belladonna and strychnine, we should make alcohol over to the doctors, and banish it from the table ; the temperance cause would be triumphant, and the agitation over, but we have to fight our battle with far other weapons. The temperance is essentially a great philanthropic movement. It is not a question whether moderation is unobjectionable or not. It finds its *raison d'être* in the suffering and sin caused and aggravated by excessive drinking ; its aim is to free many, who cannot be moderate, from temptations which they have not otherwise the physical and moral strength to resist ; it rests on the assumption that total abstinence is safe and advantageous, and that the use of stimulants is at best unnecessary, at worst a constant danger. "Depend upon it," says Cardinal Newman, "the strength of any party lies in its being true to its theory. Consistency is the life of a movement." Now, as far as the safety of teetotalism goes there can hardly be any difference of opinion ; most moderate drinkers admit the wisdom and superior economy of total abstinence, at any rate in health, and this is a very great point.

The unanswerable and crowning argument in support of total abstinence is the misery, extravagance, and disease caused by intemperance. Does anyone question that the ravages of excess are not confined to any one country, still less to a single class ? It is difficult to estimate with any approach to precision how many lives are annually lost, how many crimes committed, and how much suffering arises through drink. But every clergyman, lawyer, judge, policeman, doctor, and guardian of the poor knows that intemperance is a tremendous evil. The tone of society is undoubtedly improving, relatively and absolutely. Less money was being spent on drink, and a higher moral tone seemed to be at hand. The Drink Bill of the United Kingdom had fallen from £147,000,000 a dozen years ago to £125,000,000 in 1888, and that was something ; still, these vast sums only re-

present the direct expenditure, and to estimate the real cost of drink to the nation, enormous amounts would have to be added for the loss of time from sickness and accident, while what sum would represent the sin and the crime? Enough sin and suffering in the United Kingdom can still be traced to drink to fill the hardest heart with shame and appal the least sympathetic.

Mr. Weyland, a most respectable London City Missionary, stated before the Lords' Commission on Intemperance, that in twenty minutes 307 people were seen and counted by himself in one gin palace, at six bars drinking, and at other bars bottles and jugs were being filled for consumption elsewhere. If this is the business which one gin palace at the East end of London can do, what business is done by 150,000 public-houses in the course of a year?

To contend that education and culture teach the legitimate use and abolish the abuse is not true. But were it true, what then? The masses are not educated, moral and cultured, and will not materially improve in our time, while every medical man knows that not even the hallowing surroundings of clerical life, nor the lofty motives, which should actuate every clergyman, nor the pressure of public opinion, are enough to prevent intemperance among the clergy. As for other classes, fortunate must that doctor be who has reached middle life, and not known case after case in all grades, from the highest to the lowest; and his own profession furnishes its full contingent of drunkards. The outside world knows little of what passes in the privacy of many privileged and fortunate homes; none the less are tragedies being enacted that for pathos and suffering fiction itself could not surpass. What secrets every busy doctor could reveal were not his lips sealed—intemperance, vice, depravity, and disease little suspected by the world. To attend any medical gathering and argue that intemperance was exclusively or mainly the vice of the poor and ignorant, would provoke disapproval from everyone present. No

statement so opposed to the truth would be hazarded by the youngest and least experienced practitioner; and yet I have heard venerable clergymen argue with dignified composure that education had banished intemperance from polite society, and I have thought of the bitter words of Lord Chancellor Clarendon: "Clergymen, who understand the least and take the worst measure of human affairs, of all mankind that can read and write." A highly respectable country-town surgeon once said, standing in the market square of the place where he had practised over thirty years, that he had known at least one death through intemperance in every one of the many good houses and shops he could see from the spot where he was speaking. This man was no "fanatical" teetotaler. Simply a plain matter-of-fact person, with no romance in his composition, but highly educated, well qualified as far as diplomas went, and perfectly informed as to the circumstances of his neighbours. A thousand elderly surgeons could give testimony as ominous. No! intemperance is not confined to any class, age, or district; it abounds everywhere, and is the most frequent cause of disease, suffering, and sin in our midst. The reader would be wearied before I had finished adducing proofs of my assertion. No day passes that the press does not contain solemn warnings from men in high stations, whose lightest word carries weight, and who are not committed to the temperance movement; nay, are often suspicious of it, sometimes actually hostile to it. The most uncompromising denunciations of alcoholic beverages have come from men, like Sir Andrew Clark, who are not abstainers; and his figures go to lengths which no teetotal doctor would venture to endorse; indeed, I have been thankful to feel that his overdrawn statements did not come from the lips of an abstainer. Exaggeration is far more likely to come from a moderate drinker than an educated abstainer, for the latter is a marked man, and carefully measures his statements. Were not denunciations of

intemperance so solemn, they would, from their frequency, be intolerably wearisome, and many a man would echo the words of one of the best-known Dorset rectors of the day—"I am sick of the temperance question, and *so* tired of speeches on the subject; but my duty compels me to attend meetings and to take the chair at them." In return for all this appalling crime, suffering, and poverty, what have we? A little dear-bought enjoyment. That is the cruel sting. Were intemperance accompanied by great and lasting enjoyment, were alcoholic beverages a necessity of existence, matters would be wholly different. We look with resignation on loss of life at sea, in mines, and in factories, because the world gains as the result of those dangerous industries. Every miner, collier, and sailor perishing in the discharge of his duty we mourn over, but honour, because he has died at his post, increasing the enjoyment of others. But what does the drunkard effect? Nothing but his own ruin, and indescribable sorrow and loss to his neighbours.

Lord Bramwell made too much in the *Nineteenth Century* of the pleasure derived from a moderate allowance of alcohol. Granting that such enjoyment is real, and on that point I cannot speak, as I have been an uncompromising total abstainer all my life, is that enjoyment for an instant to be set in the balance against the misery of excess? Curiously enough, Lord Bramwell, in a subsequent article, in reply to one by Archdeacon Farrar, explained that he did not personally care for stimulants and seldom took them, and could cheerfully give them up; moreover he warmly commended the motives of earnest temperance workers. His praise of wine must therefore have rested not on his own experience but on the reports of others, and so might be dismissed as hearsay evidence. On the other hand, hundreds of thousands of men—not life-long abstainers—year after year enjoy existence, and live honest, laborious and successful lives, neither taking

stimulants nor feeling the need of them. Alcoholic beverages no more enter into their calculations than does the pleasure of smoking into that of the non-smoker. There are things the absence of which is an active and constant source of inconvenience; for example, shortness of money to the man of culture and refinement, and the yearning for foreign travel to the mind stored with varied knowledge of distant lands. In my own case to see the City of Flowers and explore the Eternal City are pleasures that I never expect to enjoy, and I acutely feel my narrow circumstances. But the pleasure of taking wine can hardly intensify the joys of life, invest existence with greater charms, and compensate for serious disappointment and unrest. Most people who take stimulants rate the pleasure very low, and are seriously hurt if thought to like them. Even the wretched victim of his own self-indulgence seldom talks of pleasure; but generally laments that he lacks the strength to free himself from a habit which gives him little pleasure and overpowers his shattered faculties and feeble will. When, too late, the pleasures are succeeded by the pains of alcohol, the dreadful character of the vice is seen in all its naked hideousness.

We also defend total abstinence on the ground of its absolute safety. There may be nothing wrong in drinking a glass of beer, and a small amount of pleasure may possibly result; but as surely as the sun is the source of light and life, so surely do drunkards come from the ranks of moderate drinkers. From some inexplicable reason this is a view of the matter that peculiarly irritates the moderate drinker; he seems to think that his own ruin is predicted; is it that he feels that he has known others, apparently as fortunate and resolute as himself, who have yielded to irresistible temptation? No one can tell who is safe; no one can say when and where danger begins. Most men are never in danger; many pass through life neither better nor worse than their neighbours, and with no great temptation to excess; but, whether

from imperfect temper or education, or from inherited tendencies, others, apparently equally fortunate in their surroundings, go wrong. Let the man who has a drunken wife, and the son who watches over a besotted mother, say whether intemperance is a trifling matter. Children do not easily form the habit of using beer and spirits, any more than they readily take to smoking. No effort is needed on their part to persevere in total abstinence; and as long as they remain abstainers they are absolutely safe from the terrible vice of drunkenness. Can anyone question that it would be better for the young of both sexes to be brought up and to remain abstainers? What a different country this would be in forty years. Moderation has been preached for two thousand years, and has not prevented intemperance.

Next to personal safety should be placed the power which teetotalism gives to influence and reclaim others. Let ministers of religion try to reform drunkards, and let them notice how seldom their efforts are successful until they are known to be total abstainers, and they will learn a useful lesson. Hundreds of ministers of all denominations have taken up the temperance cause and have signally failed until they have put their hand to the plough in right good earnest. Once admit that intemperance is among the greatest evils of the day, once determine to set to work to counteract it, and the only course open to the philanthropist is to sign the pledge.

The clergyman's hands are thereby immensely strengthened, providing that he does not, like many of his cloth, let it be known that he regards himself as a martyr. In that case his connection with the temperance cause will not aid him, and the too probable ridicule and hostility of his friends will still further weaken his efforts. The rapid spread of temperance principles among the clergy, though not always from lofty motives, and not always seconded by the practice and sympathy of their families, has

done much to make total abstinence respectable. But when the clergyman takes the matter up earnestly, consistently, and generously, and receives the support of his family, he does incalculable good and collects many earnest sympathisers around him! The same is true in a less degree of the medical practitioner, who never has personally cause to regret that he has joined the temperance movement, though his professional emoluments have a lamentable tendency to be diminished by his advocacy of total abstinence.

The dietetic value of stimulants—another stronghold of the moderate drinker—has been incontestably shown by recent scientific investigations to be small, so that without actually denying that alcohol may have some nutritive properties, it is beyond dispute that it is a preposterously expensive food. To buy stimulants simply for their dietetic properties is in the highest degree extravagant. We do not need to cite the opinions of abstainers on this point; we have only to read those of the late Dr. Letheby and Baron Liebig to smile when wine and beer are described as cheap and useful adjuncts to the dietary.

The therapeutic value of stimulants is small, though that part of the matter need not detain us. If alcohol is a valuable drug, or rather a drug which the scientific physician cannot do without, a point not absolutely settled, that is no valid argument for defending its habitual use by millions who are not ill. Moreover, we most positively contend that in many of the instances in which alcohol is administered as a drug, in accordance with medical traditions, its place could be taken with equal certainty and with smaller temptation by less objectionable agents. It would be something were medical men to think twice before prescribing alcohol. It is often lavishly and unnecessarily ordered, and thereby the countenance of the profession is given to its habitual and liberal use. Cases constantly occur in which the medical attendant could do as much for the recovery of his client

by discountenancing alcohol, while the excuse for excess would be avoided which the doctor's recommendation of alcohol is often made to serve. Would it not be far more scientific and satisfactory, when the physician prescribes alcohol, were he to order spirit of wine or one of the tinctures of the pharmacopœia? Believe one who knows, from having made many enquiries, the surgeons to Rechabite Tents do not often find it necessary to prescribe stimulants, and when they do they have to send them in medicine bottles duly labelled, like any other drug, and at their own expense. Rechabite Tent surgeons are very rarely total abstainers, so that their almost universal testimony cannot be dismissed as prejudiced.

As stimulants pure and simple, to tide over some temporary difficulty, alcoholic beverages have less to recommend them than many familiar and perfectly unobjectionable agents of the pharmacopœia, while the value of tea, coffee, and hot water is greater than often supposed, nor can alcoholic beverages claim special consideration as economisers of ordinary food, if the result of many cautious recent experiments are fairly considered. I am not discussing whether alcohol is or is not a useful and reliable drug in some cases—fewer, perhaps, than was once thought—but I am contending that when prescribed by the practitioner, it would be more scientific to order it as spirit of wine, in definite doses at specified hours, and not loosely as alcoholic or fermented beverages.

In short, the conclusion is forced upon us that alcoholic beverages have very little to recommend them, even in the arguments of their supporters, while the objections to their use reach appalling dimensions, which grow in magnitude the longer they are considered.

The subjoined extract is interesting; part is from Baron Liebig, and though open to criticism is not out of place; the remainder is from the late Dr. Milner Fothergill, whose respect for brandy was such that he told me in March, 1888, that he had ordered as much as three

pints in twenty-four hours for a patient without killing him. Perhaps there is some inconsistency in denouncing alcohol in a portion of the following quotation, and then prescribing it in enormous doses. By a strange coincidence one morning, at half-past eight, I was reading his excellent paper on "Work and Overwork," from which I made the subjoined extract, and a few hours later I found myself, in the most unexpected manner, sitting in front of that able writer and accomplished practitioner in a carriage a long way off; that was the last time I ever spoke to him, and then he favoured me with a most refreshing harangue on the value of brandy as a drug, which taught me that the most recent views as to the imprudence and danger of ordering brandy medicinally had not penetrated into every metropolitan physician's consulting-room. Would to Heaven that they had; our labours would then be easier. "The consumption," writes Dr. Fothergill, "of ardent' alcoholic drinks by poor populations is notorious. The monotony of their labour is answerable to some extent for the craving after alcoholic stimulants; *that* must not be overlooked. But it is not the complete nor full answer to the question—why do these town populations crave after spirits? Beer is the drink *par excellence* of rustics, of the inhabitants of small towns, and even of the Cockney who follows light pursuits. Liebig has something to say on that subject well worthy of deep consideration. The use of spirits is not the cause, but the effect of poverty. It is an exception from the rule when a well-fed man becomes a spirit-drinker." (Surely this remark has many exceptions.) "On the other hand, when the labourer earns by his work less than is required to provide the amount of food which is indispensable in order to fully restore his working powers, an unyielding, inexorable law or necessity compels him to have recourse to spirits. He must work; but, in consequence of insufficient food, a certain portion of his working power is wanting. Spirits, by their action on the nerves, enable him to make

up the deficient power at the expense of his body, to consume to-day that quantity which ought naturally to have been employed a day later. His physiological capital," continues Dr. Fothergill, "is clearly being exhausted, and it is no wonder that under such circumstances he dies comparatively early and certainly prematurely. Not only is such a plan essentially and radically bad, but alcohol is a pretty dear form of food. Alcohol in such concentrated form is a potent aid to the already existing tendency to tissue-degeneration. When overwork calls in alcohol to its help, the unholy alliance speedily works the most disastrous results, and brings the organism quickly to general decay. Even when the evil results of the deadly combination are not so marked, general deterioration is manifest in impaired power of labour, in inferior work, in lessened hours of toil. The tendency is to saunter away the working hours in the ale-house; partly because work is found so irksome that it is pleasant to do nothing — perhaps worse than nothing; partly because the capacity for labour has been undermined. Of course here again there is not uniformity; one organism yields more readily than another. Toil and alcohol, and sometimes alcohol with very little toil, soon reduce one man to the level of a social pariah; while in another case a hale old man will be found who works hard every day — 'never misses any time,' his fellow workmen say — yet who drinks daily an amount of spirits which would soon tell sorely on an average person. But such a case does not militate against the general soundness of the statement that overwork, combined with alcohol, is a sure and certain road to body-ruin."

Little by little the medical profession is coming over to the side of rigid temperance, in many cases, even, to that of total abstinence. The flourishing condition of the British Medical Temperance Association is a proof of this. Founded only a dozen years ago, and for a time a very weak bantling, it has now several hundred members, and its numbers are growing, not

rapidly, but surely, while its proceedings are arousing greater interest in the medical world. The professional periodicals admit the subject as they would not do twenty years ago, and sometimes allow passages to appear which strongly advocate total abstinence. Indeed, how could this be otherwise? Does any class see more of intemperance than the medical? Who can so accurately gauge its prevalence? Who can more fairly estimate the suffering it causes? And, may I add, that no other class is in an equally favourable position to proclaim its horrors in unambiguous language. Medical practitioners have in the main fought the battle of sanitary reform, and have done much other good work for the common weal, greatly to the injury of their own pockets be it remembered; and I believe that they will also fight the good fight of temperance, and, whatever the cost to themselves, bravely discountenance the use of alcohol — in health, at any rate, and restrict the resort to it in disease within very narrow limits; and when they do prescribe it, will give precise directions, and administer it in scientific forms and quantities.

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#### PATENT MEDICINES.—No. 6.\*

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HOLLOWAY'S PILLS AND OINTMENT; SEQUAH'S  
PRAIRIE FLOWER; MATTER.

Some forty or more years ago a man named Albinolo, one of the greatest of modern French quacks (proud pre-eminence!) issued large

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\* The object of this series of articles is to give a complete account, with analysis, of the numerous patent or quack medicines, and especially to bring about such a change in the Law of Patent Medicines that it shall become imperative upon their manufacturers to affix to every bottle or box in which these preparations are contained, a descriptive label fully setting forth the ingredients composing them. This regulation works admirably in various Continental countries. A systematic *exposé* of quack medicines has never before been attempted, and therefore, while thanking many friends who have given us encourage-

numbers of curious little green-covered pamphlets in which he most energetically attacked one Thomas Holloway, of London, and accused him of fraudulently appropriating Albinolo's invention. According to this amusing specimen of quarrels among quacks, Albinolo, fired with the notion of creating a fresh field for plunder in England, entrusted Thomas Holloway with the requisite means for bringing out Albinolo's preparations in this country. This Thomas Holloway seems to have done promptly and thoroughly, but he considerably exceeded instructions, for he conceived the original idea of patenting in his own name, and thus aroused the little Frenchman's ire to such an extent that the green cover of Albinolo's pamphlet must almost have been matched by the altered hue of his complexion. "Pity such troubles ere should come, 'Twixt Tweedledee and Tweedledum"; but it is not part of our province to sympathise with Albinolo, or to side with the (according to his asseverations) unfaithful Thomas.

But although Thomas was unfaithful, he did not partake of the unbelieving character of his Scriptural namesake. Thomas Holloway had not achieved absolute success as a tradesman, and he doubtless felt that the time had come for a change of vocation; so that, Albinolo's attacks notwithstanding, he straightway laid in a limited stock of drugs, boxes, and gallipots, and laid out an unlimited amount in newspaper advertisements. He believed in the gullibility of

the British public, whatever private views he might have entertained as to the universally curative character of his wares; and, moreover, he dubbed himself Professor Holloway, jumping at once from his previous modest position behind the counter of his shop in the Strand, near old Temple Bar, to the highest scientific rank. His example was contagious, and professors sprung up in all branches of business; so that, in our student days, it was quite possible to have one's hair cut by a professor, one's measurement for clothes taken by another professor, one's food prepared under the superintendence of a third professor, and one's knowledge of the "noble art of self-defence" improved by so many punches on the nose, administered for a reasonable fee, by a hulking beetle-browed professor of pugilism. In fact, professors became almost as common in England then as men bearing military titles in the United States at the present day.

We have no means of ascertaining whether Thomas Holloway added to his assumed accomplishment of Curer-General an acquaintance with the writings of the English poets; though, consciously or unconsciously, he moulded his course in accordance with the following lines from Samuel Butler's *Hudibras* :—

"To quack of universal cures;  
And mighty heaps of coin increase."

We commend this quotation to the present professorial staff at Holloway's New Oxford Street establishment as more apt and more truthful in import than the quotations which the compiler of their *Family Friend*, presented to customers, has reproduced from Shakespeare and other authors, with more ingenuousness than ingenuousness, for the purpose of puffing Holloway's Pills and Ointment.

As the *Family Friend* gives a number of anecdotes amidst other miscellaneous matter, we naturally searched its pages for some bearing upon the life of the late professor, but we were doomed to disappointment. Under the heading of "Seasonable Advice," the pills and

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ment in our task, we feel that we may reasonably ask for a continuance of their co-operation and support, and for any information bearing upon the subject under discussion. No. 1 (December issue of HYGIENE) contained an article on Mattei's Electro-Homoeopathic Remedies; No. 2 (January, 1891), on Clarke's Blood Mixture; No. 3 (February), on Chlorodyne and other opiates; No. 4 (March), Du Barry's Revalenta Arabica; No. 5 (April), Sequah's Oil and Prairie Flower Mixture. In addition to the descriptions and analyses of these preparations, the articles will be found to contain a variety of interesting matter concerning quacks and quackery.

ointment are pertinaciously recommended for all ages, all climates, all diseases, all seasons, and in all quantities. We recollect, when on a tour in Wiltshire, noticing a roadside inn at Marlborough, bearing the quaint name of the "Five Alls." The device on the sign-board swinging in front of the house is divided into five compartments, representing: 1, The Queen, with the motto, "I govern all"; 2, 3, and 4, an archbishop, a general, and a judge, respectively praying for all, fighting for all, and administering the law for all; while the fifth figure is that of a man, typical of the British tax-payer, who says significantly, "I pay for all." A somewhat similar condition of things exists as regards quack medicines, for the credulous consumers of these nostrums pay for all, whether it be the huge establishments in which the business is carried on, the many thousands of pounds spent in advertising, or the "mighty heaps of coin" which the proprietors amass.

Well, although we were disappointed in not finding any anecdotes of the late Professor in the publication to which we have referred, we need not on that account leave our readers wholly in a like predicament, but will give two stories which have come to our knowledge.

When Charles Dickens was in the height of his splendid career as a novelist, Holloway sent him a cheque for £1,000, with an intimation that he might consider it as his property if he would insert in an early number of one of his works, then coming out in a serial form, some reference to the Holloway patent medicines. Dickens, to his honour be it said, with equal promptitude and indignation returned the proffered bribe. Upon hearing of this incident, Thackeray remarked, with the quiet sarcasm of which he was master, that if he had been in Dickens' place he should have killed the villain of the novel with an overdose of Holloway's Pills, and thus have secured the £1,000.

On another occasion, in the year of the Great Exhibition, 1851, there was a large meeting of

representative men at Gore House, Kensington. Holloway had gained admission with the throng, and made use of Mr. George Augustus Sala, whom he happened to know, to obtain introductions to prominent personages. He was particularly desirous of being brought under the notice of Thackeray, and Mr. Sala, probably for reasons not difficult to seek, was equally anxious to avoid this. However, yielding at last, Mr. Sala took the Professor up to the great novelist, and managed to say a few words of introduction, despite the crowd around them. Thackeray appeared to understand the name imperfectly, and complimented the Professor in the same strain as he would have done in the case of a distinguished military officer. Holloway, confused, had to explain that he was not a general, but merely Professor Holloway. "Oh! well," observed Thackeray, "I made a very natural mistake, for you, too, must have killed thousands of people."

As to the composition of Holloway's pills, Mons. Dorvault, an eminent French chemist, reports it to be as follows in 144 pills; for convenience we give the amounts in English instead of French weights:—

Aloes	...	...	...	62 grains.
Rhubarb	...	...	...	27 "
Saffron...	...	...	...	3 "
Glauber's Salt	...	...	...	3 "
Pepper	...	...	...	7 "

Aloes, which the Sequah people falsely describe under the name of Prairie Flower (see HYGIENE for April, Patent Medicines, No. 5), is, like rhubarb, a substance possessing aperient properties; saffron and Glauber's salt are in such infinitesimally small quantity that they may be passed over without comment, and the pepper may be similarly treated.

Holloway's ointment contains, according to Mons. Dorvault, in 159 parts:—

Olive Oil	...	...	...	62 $\frac{1}{2}$ parts.
Lard	...	...	...	50 "
Resin	...	...	...	25 "
White Wax	...	...	...	12 $\frac{1}{2}$ "
Yellow Wax	...	...	...	3 "
Turpentine	...	...	...	3 "
Spermaceti	...	...	...	3 ..

There is no ingredient here, any more than in the pills, for which special remedial properties may be claimed ; yet Holloway's advertisements claim for both preparations marvellous curative characters, and assert in the most unblushing and untruthful manner, that cholera, typhoid fever, diphtheria, asthma, pleurisy, influenza, dysentery, gout, rheumatism, all skin affections—in short, every ill to which human flesh is subject—will vanish away upon the administration of the pills and the inunction of the ointment, like morning mists before the rising sun. "Allah is great!" Holloway is greater ; that is, if we believe what Holloway says. Instead of the few grains of pepper in the pills we should, bearing in mind the old proverb, require many grains of salt before accepting the professor's professions of perfection.

While on the question of analysis, we may mention that a correspondent informs us that lately a Sequah lecturer in a country town had the brazen impudence to tell his gaping audience that Sequah, Limited, defied the most skilful analyst to find out the composition of the Prairie Flower Mixture, and would give £1,000 to any one who could state what it contained. Mr. A. W. Stokes, F.C.S., Public Analyst for Paddington and other important Metropolitan districts, published a complete analysis in HYGIENE for April, but up to the date of our going to press with our May issue we have not learned that Sequah, Limited, have forwarded a cheque for £1,000 to that gentleman. Possibly they are considering the desirability of repeating the offer, in which case it is to be hoped they will also deposit the money with some person in whom more reliance can be placed, than in the wild assertions of the Company's lecturers.

Mattei's supporters still continue to advocate electro-homœopathic remedies, though in a less jubilant and confident spirit than heretofore, and we are now informed by the *Review of Reviews* that arrangements have been completed

for testing the Mattei remedies in an experimental ward at St. Saviour's Hospital, a small institution situated near to the Portland Road Station of the Metropolitan Railway. This establishment is conducted by a religious sisterhood, under the superintendence of Mrs. Palmer, who many years ago visited Mattei in Italy, and has the firmest conviction in the efficacy of the remedies in the treatment of many diseases, although somewhat sceptical as to the possibility of curing cancer by their agency. The regulations laid down by the committee are as under :—

1. That the Medical Representative of Count Mattei will be requested to draw up the conditions under which he considers that the Matteist treatment can be most efficaciously applied, and that he be allowed full and undisputed authority to apply that treatment to all the patients in the experimental ward.
2. That no patient be admitted to that ward who is not duly certified in writing at least by two competent medical men as suffering unmistakably from cancer.
3. That as far as possible the patients selected should be typical cases—that is to say, that they should include most familiar forms of that disease.
4. That the Matteist physician will keep an exact record of the treatment to which he subjects the inmates of the ward, specifying the description of the medicine employed, quantity of the doses, and the nature of its application, in a book to which the Committee will have at all times access on visiting the Hospital.
5. Should the Matteist physician at any time feel bound to employ other medicines in the treatment, such medicines to be particularly specified, in order that the fact of their administration may be duly taken into account in estimating the effect of the treatment.
6. Every patient before entering the ward must sign a paper stating that she voluntarily submits to the Mattei treatment, and will abide faithfully by the conditions laid down for the experiment. Should any patient, in the course of the treatment, become impatient or refuse to remain any longer in the ward, the experiment in her case will be regarded as having no conclusive result ; but a report will be drawn up in every such case as to the results which have so far been obtained, and steps will be taken at once to fill her place with another patient.

These rules leave everything, it will be seen, to the Matteist physician, whose name is withheld, although most people would think that it would be of such importance that it should be

published. As regards the committee of investigation it has been decided, says the *Review of Reviews*, without telling us by whom, that a small committee, consisting of Mr. Stead, Sir Morell Mackenzie, and Dr. G. W. Potter, with the occasional assistance of Dr. Lawson Tait, of Birmingham, will suffice to see that the experiment is fairly tried. This may be the opinion of the gentlemen whose names have been enumerated, and of the Matteist partisans, but we fancy that it will not be regarded in the same favourable light by the medical profession or by the general public. The former were gratuitously insulted by a boastful challenge on behalf of Mattei, and a demand for a sum of £5,000 or £10,000 from them, wherewith experiments might be conducted. As we pointed out at the time, instead of funds for the purpose of testing a quack remedy being provided by medical men, whom Mr. Stead sneeringly described as "the orthodox faculty," the money should have been forthcoming from the Count himself, who, according to calculations based on Mr. Stead's own figures, must be making the handsome annual income of £100,000 through the sale of what appears from able analyses that have not been disputed (published in *HYGIENE*), to be little, if anything, else than coloured water. Why should not the preparations have been subjected to rigid independent analysis? Why should the experimental treatment be carried out in a hole-and-corner fashion? Why should the committee be so small, and include amongst its few members a Matteist partisan, so bigoted that he declined to accept the opinion of Cardinal Lavigerie, when adverse to his views, though he had previously put the Cardinal forward as one of Mattei's adherents? These and similar questions must not only naturally suggest themselves to every unbiassed mind, but must also completely deprive the report on the experimental treatment of any value or interest.

THE EDITOR.

## SCAVENGING, TOWN-REFUSE, AND SEWAGE.\*

By CHARLES JONES, A.M.Inst.C.E., Past President of the Association of Municipal and Sanitary Engineers, and Surveyor to the Local Board, Ealing.

[Continued from page 115.]

### TOWN REFUSE.

MR. CODRINGTON, in his report on the Destruction of Town Refuse, says:—"Town refuse consists of the contents of ashpits and dustbins, market and trade refuse, and the sweepings of paved streets, and includes materials which, when sorted out and separated, may yield a small return, or can be utilised in some way."

But this part of the refuse has, from various causes, lost much of whatever value it formerly had, and the sanitary objections to the handling of an offensive material for the sake of a small gain are now more generally recognised. It has also become more and more difficult to get rid of that part of the refuse which is absolutely worthless. The practice of filling up pits, quarries, and hollows with materials containing putrescible matter, sometimes to be afterwards built on, is now properly condemned on sanitary grounds, and town authorities, when places for deposit within their own boundaries are no longer available, find neighbouring authorities more and more averse to allow refuse to be accumulated within their districts. The disposal of town refuse has thus become almost everywhere a troublesome question.

It may be remarked that the quality and variety of the various articles which come under the heading of town refuse vary very much with the district in which the collection may be made, as well as in the various portions of the same neighbourhood; sometimes, indeed, the family bins become a dépôt of treasure—

\* A Lecture delivered at the Sanitary Institute.

rags, bones, and cinders, with an occasional sprinkling of silver spoons, but not often. One thing is certain, viz., that a very large amount of material finds its way into the cart or van under the head of town or dust-bin refuse which ought, by being utilised in the closed stove, to go largely to reduce the family coal bill, and save the breadwinner from the trouble which that document occasionally brings. It is, however, satisfactory to note that during the past ten or fifteen years there has been much improvement in this respect. The cinder-sifter does its work, and really "the dust"—to use the expression of one of my foremen upon the subject only a few days back—"ain't worth having now; it's only Mondays and Tuesdays that's any good." In other words, from only a certain class of the district could any cinders be obtained. The remaining districts used the cinder-sifter.

The following description of a dustyard upon the old method I extract from the valuable report of the Medical Officer of the City of London, W. Sedgwick Saunders, Esq., M.D., printed in the early part of 1881. He says:—"When the dust carts arrive at the wharf (Letts') their contents are tipped into heaps at the place most convenient for the people who are employed as sorters. About seventy persons, chiefly women, were engaged in this degrading and loathsome work, most of whom are paid by piece-work, but sixteen female sifters received seven shillings and a little coal and wood weekly. The appearance of these women is most deplorable, standing in the midst of fine dust piled up to their waists, with faces and upper extremities begrimed with black filth, and surrounded by and breathing a foul, moist, hot air, surcharged with the gaseous evacuations of disintegrating organic compounds. They resemble the denizens of the place said to be paved with good intentions, rather than the image of their Maker." And then Dr. Saunders goes on to say: "I shall not forget visiting some of these poor creatures

in a hospital, and witnessing the condition of their skins when the accident to the chimney shaft occurred." This was the state of things in 1881.

The day of the golden dustman has passed, and as I have before intimated the little cinder sifter has created a revolution so far as things valuable—or relatively so in bulk—are concerned.

For many years the difficulty of dealing with the house refuse has been felt more and more, and as the value of the picking has declined, so has the monetary question become more and more a source of difficulty. In years gone by the dust contractor paid a considerable sum annually for the privilege of collecting the dust. Gradually the position of affairs was altered, and the contractors had to be paid. To them the soft core, as it was termed, became a nuisance, and the ready mode of dealing with it was to remove the nuisance "from my own door and fix it opposite my neighbour's," or, in other words, the soft core was removed from the yard and tipped into the nearest shoot, and when the outcry arose which prevented that particular mode of dealing with the nuisance, it was barged away to some country district, and having been well fired was allowed to smoulder away and pollute the neighbourhood for miles. This actually happened in my own particular neighbourhood, and I am within the mark when I say that an immense heap, probably some ten to fifteen thousand loads, was for a very long time, against all remonstrance, allowed to pollute the valley of the Brent, till at last the strong hand of the law was put in force to suppress the nuisance.

The question of the best mode of dealing with this difficulty has occupied the thought of numerous inventors for many years, and it was only natural to fall back upon that which has been the, and we presume will ever be the, great and natural agent for purification, "fire." If time afforded, and the present were a fitting opportunity, we might very well spend an hour

in tracing back the employment of fire as a sanitary medium. We cannot do that, but simply refer to the fact that it is now between thirty and forty years since furnaces were constructed for the purpose of destroying refuse. Most of these were built either by contractors, or those who did not consider, in a scientific way at any rate, the action of heat, and how to utilise the small combustible portion contained in refuse, to burn up the larger quantity of less combustible material. The shape and general construction of the fire-brick arches was wrong, the arrangements for feeding were bad, and the flues and passages for gases were designed more by guess work than calculation. It is therefore no wonder that these proved to be only feeble attempts to introduce the principle of fire. It was found necessary to burn coal or other fuel in these furnaces, in order to dispose of the refuse as collected. They were therefore only used ultimately for burning paper, straw, hampers, and baskets, and other light materials—several are used for that purpose at the present moment. One of these furnaces was built by the corporation of Manchester, about 1873, and many alterations were made from time to time. After three or four years of experiments, about the year 1876, Mr. Fryer (of the firm of Manlove, Alliott & Co.), of Nottingham, appears to have come upon the scene of action, and arranged with this Corporation for a trial of his furnace, which he named "The Destructor." This trial turned out sufficiently successful to induce the authorities to have another erected, and in a very short period they had no less than three large destructors built upon Fryer's patent.

Birmingham Corporation followed next, then came Leeds and Bradford. About this date Messrs. Pearce and Lupton, of Bradford, invented a furnace for dealing with town refuse, and the Corporation, of which Mr. Pearce was then a member, allowed them £50 for a six months' trial, to prove the "said" advantage of

their invention. These furnaces consisted of firebrick arches, feeding hopper and regulating dampers, and perforated firebrick walls at the back of each cell. The inventors claimed many advantages, and especially mentioned the perforated walls for dealing with offensive gases. The trial appears to have been conducted upon fair lines. The Sanitary Committee instructed one of its officials to superintend and to note the quantities of work done, the wear and tear of cells, the amount of smoke and smell given off, and the inventors were allowed to engage their own men and work the apparatus in any way they thought proper. Although several improvements were made and a fair amount of refuse burnt, they abandoned the trial.

The next invention came from Pickard, who had been employed by the Leeds Corporation as foreman at the Destructor Works. He called his refuse destructor the "Gourmand," and it consisted of a large fire arch, with two sets of furnace bars and two furnace mouths to one cell. Although there was nothing to favour this form of cell, there was certainly one part of his invention which is of the highest importance, and that is the flues and second fires. He conducted his gases from the cells down a horizontal flue, and erected two ordinary fireplaces in this flue, with the fire crossing it, or the fire bars at right angles to the flue. He had exactly the first part of the principle which I have adopted in my "Fume Cremator," viz., by the action of fire the gases given off from the cells are purified, and if he had built his furnace carefully and made continuous practical trials, he would doubtless have arrived at the several features contained in the cremator, and thus have solved that part of the problem instead of leaving it to me to do. Passing over the various patents, interesting though the discussion might be, we feel that the whole question has reached far beyond the stage of experiment, if not of criticism, for at the present moment the Destructor is at work in

some 35 towns in England, and is in course of erection at several other towns. It has put in an appearance at Wellington, N.Z., and one, consisting of 12 cells, is, or will soon be, doing its work at Melbourne. And as a fact, at the present moment there are 200 cells at work in England, destroying the house refuse at the rate of five hundred thousand tons per annum. Each cell constitutes a separate furnace, consisting of a cavity enclosed by a reverberatory arch lined with firebricks. It is supplied with a hearth for the reception of the material to be consumed, from which it passes into the furnace proper. The firebars are placed in a slanting position, in order to favour the passage of the material to the front, and so facilitate the removal of the clinkers. The top of the destructor forms a perfect platform, having an opening over each cell into which the refuse to be burnt is shot from the collecting carts. The opening for the entry of refuse is divided from the opening for the exit of gases by a wall, and a bridge is built to prevent refuse which is heaped on at each charge from getting into the flue immediately below. Cells are provided with special openings for the introduction of infectious mattresses, diseased meat, or dead cats and dogs, which fall direct upon the red burning mass, and are there consumed without nuisance. The clinkering is done about every two hours. The garbage burnt varies very much according to the district, and the quantity of clinker and fine ash will vary in proportion to the class of material burnt—in some cases it has been as low as 10 per cent., and in other cases as high as 33 per cent. of the material collected. At Ealing the average is 25 per cent., the residuum being a good hard clinker. The clinker is valuable for various purposes, and is used for concrete, tar-paving, artificial stone (when ground up as sand), for building, path-making, hard core for roads, and when used for the construction of walls, makes a splendid and indestructible material.

So far the house refuse is transformed from a filthy and deleterious matter into a material at once inoffensive and useful. This does not, however, conclude the usefulness of the apparatus; it has still another property to which we shall have to refer a little further on—viz., its immense steam-producing power, heat.

The opposition which this useful invention has experienced in almost every town in which it has been fixed is almost incredible, and one would think, by the arguments advanced against it, that it was an invention of the devil rather than one of the most valuable sanitary appliances a town can possess. No doubt, in its primary condition, there were defects, but at the worst they were as nothing compared with the offence and injury to health, which are so successfully obviated by the rapid destruction of tons upon tons of objectionable matter, which must, in some way or other, be dealt with.

We admit that formerly the vapours given off in the drying, and the vapour and gases given off by the material in the first stage of burning, and before it got well into the fire, were perceptible, and were the cause of complaint, as was also the very fine dust which escaped from the shaft. These are now things of the past, and the fact that some of our health resorts have the destructor in full and successful operation, whilst in London in such suburbs as Battersea, Hampstead, Hornsey and Ealing the same class of work is done, goes to prove beyond a doubt that the destructor, if properly worked, may be used anywhere and everywhere without the slightest fear of any complaint arising in connection with the same. In evidence before a Select Committee of the House of Commons, Dr. Thomas Stevenson, Lecturer on Chemistry at Guy's Hospital, and member of the Royal Commission on Metropolitan Sewage Discharge, said: "If a Fryer Destructor, with Fume Cremator, was erected, it would not be possible to affect the health of the surrounding population, or cause the slightest nuisance of any kind or description."

Mr. Codrington, giving evidence before the same committee, said: "He considered the Fume Cremator a very great safeguard against nuisance or annoyance, as it much increased the heat and enabled a more thorough destruction of noxious gases, half-burnt paper, and other things which escaped." The change which has taken place in public opinion in connection with the Destructor is strikingly illustrated by the establishment of a splendid sanitary dépôt replete with every imaginable convenience, and within a short distance of the High Street, Hornsey, which was opened by Mr. R. D. M. Littler, Q.C., Chairman of the Middlesex County Council, on the 13th December last, who, in his address to the assembled visitors, said, "It was a thing of general importance in parishes like Hornsey, and as Chairman of the Middlesex County Council, he congratulated them on the great work they had accomplished."

This refuse furnace consists, at present, of six separate cells, and arrangements have been made to increase the number when necessary. The gases are conducted from the furnaces by a large flue to the Fume Cremator, where they are subjected to a temperature of 1,100 deg. F. These furnaces are the design of Goddard, Massey and Warner, of Nottingham, the "Fume Cremator" the same as is in use at Ealing, and, with the several Destructors, erected during the past five years.

I should perhaps at this point add that the simple contrivance now known as the "Fume Cremator" was the result of one of those happy thoughts which sometimes come as the reward of earnest investigation. The difficulty which assailed me at Ealing had engaged the attention of many scientific men for some years, and it fell to my lot to solve it, and that in a very simple manner. The Fume Cremator consists of a reverberatory arch, with rings of firebricks placed in the direction of the gases. Ribs of firebrick projecting from the arch serve to deflect the gases, and direct them on to the

top of a red-hot mass of fire. An intense heat, from 1,000 to 1,500 degrees, is maintained at little expense of fuel—very fine coke breeze and the ashes screened from the refuse being all that is required, and by regulating the supply of air beneath the firebars, and a further supply to feed the vapours as they pass into the cremator. Dr. Tidy, in a lecture at the Society of Arts, in 1886, on the treatment of sewage, says:—"To my mind the Destructor has reached its highest state of perfection at Ealing, from the great thought that Mr. Jones, the surveyor of Ealing, has given to it. His sludge there is mixed with house refuse and burnt. Mr. Jones's view is that *every town produces sufficient house refuse to burn the sludge*. One has to notice the differences of Destructors. I have seen a good many myself, and I should say the differences are mainly two: first, a certain escape of offensive vapours from the shaft, and I think those offensive vapours are mainly due to partial burning—the destructive distillation, as a matter of fact, of the materials, instead of their complete destruction; secondly, the escape of fine sand and such like from the shaft at certain stages of the operation. I have seen those two nuisances very well marked, and I had occasion to advise on them on more than one occasion. I cannot help thinking myself that in Jones's plan, where he places a muffle furnace, or "fume destroyer," as he calls it, between the furnace and the main shaft, he has in a great measure met those two difficulties."

The most striking evidence probably in connection with the cremator is obtained from Bradford. Very extensive Destructor work was carried on there. In 1885, Dr. Odling was called in to advise upon the difficulties which were met with from causes already referred to. In a very elaborate report presented to the Chairman of the Sanitary Committee, he recommended the combustion of the gases, &c., after they had passed from the cells. Dr. Odling was not aware at the time of making

the report that the Fume Cremator had been in existence for six months, and was actively demonstrating the correctness of the conclusion at which he had arrived. Suffice it to say, that during the past year Fume Cremators were added to the Destructor, and at the close of the year, when the opening ceremony took place, the Chairman justly claimed that Bradford had solved the question satisfactorily. To further testify to the complete cessation of the emission of noxious vapours, samples were collected in a glass vessel by Mr. Rimington, the Borough analyst, in the manner approved by experts, and these were submitted to the olfactory organs of the company, who were unanimous as to their inoffensive nature.

Mr. Codrington, in his valuable report upon the subject of town refuse and the Destructor, mentions that further improvement may still be made—a truism applicable to most machines—and a careful watching of the apparatus has led me to make several since Mr. Codrington's report was made. They chiefly, with one exception, appertain to the comfort of the men who work the Destructor, by a prevention of the dust which has been an objectionable adjunct to the work; also an automatic door, to prevent the inrush of cold air when stoking is being done. These, although small items, add much to the efficiency of the furnace.

Before closing my remarks upon this portion of my subject, I must make special reference to one special feature—viz., the immense amount of steam-creating power that for many years has been literally thrown away. In this I am sorry to say London has been woefully behind many of our country towns. At Southampton, a town of 80,000 inhabitants, the heat derived from the burning of the refuse is used in connection with a thirty horse-power tubular boiler, which is used for pumping some 500,000 gallons of sewage effluent, for working one of Shone's pneumatic ejectors, for driving the dynamo in generating electricity, and for working the various machinery in use at the Sanitary Works.

At Hastings it is used for pumping the sea water into tanks for watering the streets, and for driving dynamos for electric lighting, and is about to be utilised for driving dynamos for lighting the sea wall, promenade, &c.

At Blackpool they are about to utilise the heat for driving electric tram-cars, which will save £200 per annum in fuel; and at Blackburn, where they are erecting Destructors, they intend using the power for generating electricity for the supply of the large cotton factories. At Preston, where they are about to erect a 20-cell Destructor, it is intended to utilise the power in working ten 1,000 Shone ejectors for lifting the whole of the sewage. These are a few illustrations of the utilisation of the house refuse. Every cell will burn sufficient fuel in twenty-four hours to keep a 5 horse-power engine going, and, as I have before stated, there are some two hundred cells at work in England, equal to horse-power of something like 1,000. In most cases it may be said that the proper utilisation of this power will effect a considerable saving, and after paying the principal and interest upon the thirty years' repayment scale, will leave a considerable balance. At Ealing this has been proved most thoroughly, leaving, in this case, a good balance in favour of the rates. I have entered perhaps more fully into details upon this particular question than I otherwise should have done, inasmuch as it leads me on the vexed question of sewage, and the view I may have on that particular subject.

#### SEWAGE

Being the third subject of my paper to-night, we have neither the time nor the inclination to enter into a discussion on this wearisome question. Touching upon the various views propounded by irrigationists and utilisationists of every form and degree, of the manufacture of so called manure, or the large profits which are to be made by agriculturists, will be quite opposite the mark, and probably no new point can be raised in connection with the same,

except from the fact that the London sewage question is just now coming to the front in the form of two separate schemes, one by Messrs. Bailey-Denton and Colonel Jones, and the other by the veteran sanitarian, Sir Robert Rawlinson, late principal engineer to the Local Government Board, one proposing the Canvey Island scheme and the other the Maplin Sand scheme. Both of these schemes involve an expense in which millions are represented. Of necessity the public mind is largely occupied in connection with it. These schemes have brought forth a vast amount of criticism, not to say opposition, by those whose interests are affected. And last, if not least, however insignificant the real native oyster may be, a voice has been heard from those interested in these denizens of our coast, which I am afraid will appeal to a large number of our fellow-citizens to whom the sewage question, up to within the last few months, has been a matter wisely left in the hands of sanitarians and engineers. The question has been asked, and we think wisely, what is the necessity for conveying the sewage beyond a point at which we find it at present—viz., Barking and Crossness, or the northern and southern outfalls, to a point forty-six miles off, and discharging it into the sea, and spending millions in forming a sewage conduit. In Mr. Dibden's paper, read some years since, upon the sewage sludge question, before the Institute of Civil Engineers, he said: "By burning, the whole of the value of the sludge, whatever it may be, is absolutely lost, but when it was taken out to sea it served to manure our fish fields instead of our cornfields." Our friend the oyster naturally objects. He differs very materially from Mr. Dibden, and also Sir Robert Rawlinson, and my own impression is that that voice is bound to be heard, and with great attention.

' If sanitarians and engineers should unanimously decide that the product must be wasted—let it, at any rate, be wasted elsewhere, and let an irreplaceable British industry be spared.'

—*Daily Telegraph.*

The point raised by Mr. Carpenter, in his letter in the *Globe* of January 12th, does not accord, it strikes me, with the views expressed by Sir R. Rawlinson. Dr. Carpenter is an irrigationist to the full, and all who know him believe most fully in the genuineness of his own opinion, however much they may differ from him.

It appears to me we cannot help reading between the lines, although the point has been raised of diverting the sewage here and there upon the line of conduit, and forming farms, larger or smaller, as the case may be. There can be no doubt that the point in Sir Robert's mind is to remove the nuisance from its present position, and deliver it at outfalls far beyond the possibility of any nuisance so far as the Thames itself is concerned. Mr. Carpenter says: "Will not Lord Rosebery take the matter up, and ask for 15 millions of money, and take a dozen or more sites of 1,000 acres each." £15,000,000 is a large sum of money and will require a considerable amount of thought, and depend upon it Lord Rosebery's successor will give it much thought before he is led into any such gigantic and, I cannot help saying, unjustifiable scheme. On February 4th a letter appeared in the *Globe* suggesting the possibility of some other mode of dealing with the subject. It informed the public that some thirty years ago the authorities at Bombay had a large cremator constructed by an English engineer, which destroyed offensive matters.

(To be concluded in the June number.)

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### FACTORY CHILDREN.

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By JAMES S. TORROP, M.D.,  
Certifying Factory Surgeon, Heywood,  
Lancashire.

PUBLIC attention being directed to the condition of factory children by the measures at present before Parliament for their benefit (?) I propose to put a few facts before the readers

of HYGIENE from my experience. For some years I have, as certifying surgeon, taken notes of the exact condition of every child that came before me. These particulars were taken simply for my own information, and I give a précis of the first 2,000 cases noted. 1,771 of these may be described as specimens of the ordinary factory child, and I separate them into three classes—341 superior, 1,106 medium, and 324 distinctly below average (Lancashire average, *nota bene*). As to the rest of the 2,000, 151 were really fine children, of whom 21 were excellent samples of humanity, the best of them being three admirable children, weighing 130 lb., 126 lb., and 120 lb. respectively. The balance of the 2,000, 78 in number, were a feeble folk, amongst whom were some eight veritable pygmies, ten to thirteen years old, and not scaling 50 lb. a-piece. It must be borne in mind that the medium average of Lancashire factory children is not equal to the average elsewhere. The latter standard is hardly reached by the 341 children described as superior, while the medium division is greatly below the standard of good health. This is much more distinctly marked amongst children of thirteen, "full timers," who have passed some years in the factory, than it is in those of ten years of age. Of 60 healthy children, averaging thirteen and a-half years, and taken as they came (31 girls and 29 boys), the average weight was 74 lb., or 18 lb. below the average of good health elsewhere. The lower division of 324 included many defective and diseased cases, and of course the 78 residuum were poor indeed. The cases of defective or diseased children numbered 198. Only nine of the diseased children were summarily rejected. Where the families were very poor many pitiful cases were allowed to work, as a wage-earning child enjoys more consideration, and has better opportunities at the family board. As many as possible were dealt with by treatment and advice to parents as to nutrition and removal to healthier surroundings.

Factory work is not so excessively laborious ;

it is the heat, impurity, and dust-laden state of the atmosphere that injures health. The promising child of ten degenerates into the lean and sallow young person of thirteen, and this process is continued until a whole population becomes stunted, and thus the conditions of life in factory towns become a real source of danger to England's future.

In addition to the loss of physique, it is instructive to note the deterioration in personal appearance. Out of the 2,000 children under notice, only sixteen could be described as handsome, and of these the larger portion were girls from Ireland—a small oasis of beauty in a vast desert of plain looks !

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## W I N E .

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WINE is commonly described as "the fermented juice of the grape," yet it is not always so when we consider how much stuff is sold as wine which is perfectly innocent of any acquaintance with the produce of the vineyard. Not long ago it was recorded in this periodical that the Municipal Laboratory of Paris, whose function is to detect adulteration, had recently caused to be seized by the authorities 15,000 casks of so-called wine. The official analysts could not find in the whole lot a single drop of grape-juice ; but what they did discover were as follows :—Water, alcohol (none of the best, the reader may be certain), glycerine, sulphate of gypsum, salts of potash, &c., and berries for colouring. Could any compound be more villainous, or more remote from the generous properties of sound, honest wine ?

Speaking of colouring reminds us that the juice of every grape is white ; there being only one solitary exception to this rule, viz., the Pontac grape. The colour of red wine is derived not from the juice, but from the skin of the grape. Three-fourths, or even a larger proportion, of champagne is made from red grapes, which, if allowed to ferment with the skins in the vinous fermentation, would give red wine

as the result, similarly to the produce of other red grapes; the *œil de perdrix* (partridge-eye) colour noticeable in champagne, commonly associated with good vintages, is imparted to it unintentionally, in consequence of the grapes being ripe to bursting when gathered, so that the colour from the skin slightly tints the pulp. A marked instance of this occurred in the famous vintage of 1874.

Every wine-growing country puts forward some claim in favour of its own production, and amongst critics, where so many different tastes are concerned, the old Latin proverb, "*Tot homines, quot sententiae*"—So many men, so many opinions—holds good. One will talk enthusiastically of Champagne, another will be rapturous about Chianti, a third will boast the virtues of Burgundy, and so on; but Mr. Webber, a high authority on these matters, asserts that Port is the finest of all red wines, and that Sherry is the finest of all white wines, basing his opinion on the fact that these two engender naturally, in the process of fermentation, a larger proportion of alcohol than other wines, thereby denoting greater power to develop quality, ethers, &c.

It is to the volatile ethers which age develops in wine, particularly when in bottle, that the flavour and the highly-prized aroma, technically termed "bouquet," are due; and their formation is the result of the action of the alcohol generated during fermentation upon the bitartrate of potash contained in the grape juice.

The authority just quoted (Mr. Webber) says, in his interesting little book on wine:—"Sweetness in wine may be compared to charity in human nature—it covers a multitude of sins." Yet how many persons insist on giving the preference to sweet, rich wines, with the result that, owing to the circumstance that saccharine matter is more difficult to digest in combination with wine than in any other form, acidity and indigestion are sure to be produced, and these, sooner or later, make way for

rheumatism and gout. Saccharine articles of food, if used to excess, will have a similar effect, though not to a corresponding extent.

Taking one hundred degrees to represent proof spirit, the following figures will represent the percentage of alcohol contained in different wines, or, in other words, their relative strength:—Port, 36 degrees of strength; Sherry and Madeira, 34; Burgundy, 19 to 20; Champagne and Claret, 15 to 18 per cent. The five principal spirits, Brandy, Whiskey, Gin, Rum, and Hollands, are generally sold by merchants at from 10 to 20 degrees under proof (licensed victuallers being allowed to sell them at as low a standard as 33 degrees under proof); consequently, one glass of good brandy mixed with one and a half glass of water would be equal in strength to two and a half glasses of port, or rather more.

The keeping property of wine is due to tannin, which is obtained from the skin of the grape during fermentation. The greater astringent properties of red wines as compared with white wines is owing to the circumstance that the skin of red grapes contains a larger proportion of tannin.

The practice of drinking champagne has grown much of late years, and is still on the increase; in evidence of which we may mention that the enormous quantity of 23,558,084 bottles of champagne were exported from the districts in which it is made during one year, showing an excess of 2,223,760 bottles over the exports of the previous twelve months. The report from which we quote these figures puts down the stock at present in the vaults of the champagne growers at 100 million bottles, or about four years' supply.

The habitual drinking of champagne in excess is more injurious to the nervous system than almost any other habit, and we are pleased to see that Mr. Webber denounces it in his book as "one of the most pernicious practices." We happen to know at the present moment two cases in which men of previously strong

constitution have become hopelessly stricken with insanity through the excessive use of champagne as a beverage. The younger the wine, the more likely is this result, which takes the form of imbecility, through softening of the brain. Moral: Buy the best champagne, and don't drink too much of it.

The fashion of drinking champagne has reached almost absurd limits. People do not object to paying six or seven shillings a bottle for champagne not four years old when the same money would buy a ripe, good wine of any description ten to fifteen years old at least; yet the same individuals would grudge half of this sum for a bottle of port or sherry, and even a fourth of it for claret. The consequence is that the latter wines fall into further disfavour because so many hosts put inferior qualities of them on their tables.

It is curious to consider how much mere accident may influence the national consumption of any article of food or drink. The commencement of the now exploded habit of port-wine drinking to a large extent dates from the year 1703 when, by a reciprocal reduction of tariffs, the English Government made the duty on port one-third less than that charged on the wines of other countries, the Portuguese conceding a corresponding reduction as regards our woollen goods. This led to the gradual substitution of port for French wines, which many years afterwards suffered a greater check during the long period of war between England and France, leading to the further encouragement of the wines of Portugal, as well as those of Spain, with both of which countries England was on friendly terms.

Of late years clarets have come more into fashion, and this may in some degree be attributed to fiscal reductions; moreover, the vintages in the claret districts are carefully conducted upon the most scientific principles, while in Spain and Portugal the wine growers, being mostly small farmers, continue in many instances to make their wines according to the

primitive methods practised by their forefathers for many generations past.

As the general use of wine has increased, other countries than those from which our supply was formerly obtained have entered into competition, and two of our colonies, the Cape and Australia, are shipping larger quantities to the mother country every year. The latest of the new competitors is Servia, which possesses in various parts great natural advantages for viniculture, and sent an interesting collection of wines to the Paris Exhibition.

We would recommend our many medical readers to bear in mind Mr. Webber's remarks as to the almost reckless manner in which physicians direct their patients to drink various wines, without troubling themselves at all as regards the importance of taking into consideration the wide range of difference between the dietetic properties of inferior and superior kinds of wine bearing the same name, and therefore, to the uninitiated or careless, nominally identical. In this, as in other instances, it will be found that the best is the cheapest in the long run, because it gives the most ample value for money, where a judicious selection has been exercised. By the way, the British Pharmacopœia recognises only one wine, namely, sherry, or white wine, in the composition of different remedial preparations. Speaking of the pharmacopœia in this connection, reminds us that the old *London Pharmacopœia*, issued by the College of Physicians, contained, under the heading of *Mistura Spiritus Vini Gallici*, excellent directions for the preparation of egg flip, a most agreeable beverage in cold weather.

We have always objected to the icing of wine, previous to its use, from a hygienic point of view. Indeed, it requires very little consideration to convince any reasonable individual that it must be injurious to take into the stomach a quantity of fluid artificially lowered in temperature, especially when one is in a heated room, or after taking food. Mr

Webber's practical knowledge brings another argument to our assistance, for he says that icing wine conceals the defects of inferior sorts; in fact, it baffles the power of ascertaining either its bad or its good qualities, owing to the extreme coldness partially or entirely blunting the sense of taste. The most perfect temperature for wine is about 60 degrees, and this condition may be attained by bringing the wine out of the cellar into the dining-room a moderate time before it is used. Sparkling wines may be brought direct from the cellar when required, as the risk of expanding the carbonic acid gas contained in them is thus minimised, and the excuse for icing them is then done away with.

At the commencement of this article, we spoke of the adulteration of wine. One of the substances frequently employed in tampering with wine is salicylic acid, which exists naturally in different species of the willow (*Salix*) and various plants. Commercial salicylic acid is obtained from coal tar, like many other products of modern chemistry. This compound possesses anti-fermentative powers, and has therefore, of late years, been much resorted to for the purpose of checking the fermentation of young wines sooner than this process would be completed if not interfered with. By resorting to its use, a dishonest manufacturer or merchant is able to perpetrate a great fraud upon the purchaser, and it is therefore prohibited by law. In addition, it exercises serious effects upon the health of the consumer, as it acts as a powerful depressant upon the circulation and nervous system. The presence of salicylic acid can be readily detected by suitable tests, as can that of all the other numerous abominations with which wine is adulterated.

W. A.

#### PUBLIC HEALTH REPORTS.

THE RURAL SANITARY DISTRICT OF STAINES.—THAMES WATER.—Dr. Blaxall, one of the Local Government Board Inspectors, has just

published a report upon this district. It discloses a state of things which one would hardly expect to find so near to the Metropolis, and it is of special interest as bearing upon the important question of the fitness, or otherwise, of Thames water, as supplied to more than four millions of people in London for drinking purposes. This is a matter of serious concern, and was dealt with in an able article by Mr. Jabez Hogg in our last issue, as well as in a shorter article in the March number. We notice that our excellent contemporary, the *Kingston and Surbiton News*, of April 14th, while speaking highly of Mr. Hogg's paper, commented on the circumstance that at page 101 the telling quotation made by him was some ten years or more old, when the Lambeth Water Company took its supply from a point near to Molesey and Ditton, where the filthy stream called the Rythe was sending its poisonous water into the Thames. Since then the companies have gone somewhat higher up the river, but this does not improve matters much, as will be seen on reference to Dr. Blaxall's comprehensive report.

The general filthiness of both soil and water in the Staines Rural Sanitary District are set out in this report with a clearness that cannot fail to convince even the most sceptical, and to alarm the most apathetic. "Besides the rain that falls in the district, large volumes of water course through the river gravel which forms the subsoil, and into this gravel are washed the contents of several thousand cesspools purposely dug in the gravel for convenience of discharge thereinto. The water thus befouled flows directly or indirectly into the Thames." This would be a grave sanitary evil at any portion of its course, but it is especially so in this case, for the part where the river is thus polluted is just above the pumping stations of several of the great London Water Companies at Sunbury.

While not attempting to measure the amount of actual impurity in the Thames above the intakes of these companies, Dr. Blaxall sums up

the condition of the water as being very bad, and he directs attention to the prevalence in the Staines Rural District of that particular disease, typhoid fever, which disseminates itself by means of water. During the past seven years forty-nine deaths from this disease have occurred in the district under notice, and this total of deaths may be taken as indicating at least 500 cases of typhoid fever amongst a population of some 20,000 persons. "Nothing but the efficiency of the water companies' filtration stands between the typhoid matter entering the river at Sunbury and the consumption of that typhoid matter by the water-drinkers of half London. We have been charged with being alarmists by some of our contemporaries (although others have insisted on the soundness of our remarks on the danger of Thames water for drinking purposes) as well as by the representatives of the London water companies. In the face of such an unbiased, authoritative opinion as that advanced in this report we do not see what possible argument our opponents can find in favour of London continuing to derive its water supply from the Thames. The filtration system of the water companies is notoriously apt to prove a delusion and a snare. The only excuses that the Grand Junction Water Company could produce as recently as last February, when the contaminated state of the water supplied to its customers was made a subject of discussion in the House of Commons were—that the Thames was unusually muddy, that the filter beds were inadequate, and that the storage was insufficient! Comment is superfluous.

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## Notes and News.

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FEMININE KINDNESS TO ANIMALS is curiously illustrated in the following advertisement taken from a recent issue of an evening paper:—"A lady wishes to have from the country a period-

ical supply of live sparrows for a favourite cat. Address, with terms, Trixie," etc.

CYCLING; A CAUTION.—The long-distance champion, Mr. Holbein, who has headed the record by riding 336½ miles in twenty-four hours without experiencing any ill effects, has lately given his opinion in *Cycling* on the subject of feats of endurance in bicycle riding. He specially advises aspiring cyclists to train themselves by taking long, regular walks, by which the body can become accustomed to endure fatigue, and be gradually built up so as to enable it to sustain great efforts when called upon, without injury to the constitution. He regards abnormal muscular development as quite a hindrance, and he emphasises the fact that muscular strength is not stamina. While on this subject we would enter a strong protest against the awkward, slovenly, and unhealthy position adopted by many in riding—we had almost said the majority of the London and suburban cyclists. Residing near some of the best roads for cycling, about twelve miles from London, it is not an unusual thing for us to see, upon holidays, several hundred cyclists in the course of the day, and we cannot help noticing with regret the great number of bicyclists who, stooping forwards, bend their bodies into curves which must be as injurious to health as they are ungainly in appearance; this, too, on roads almost as level as a bowling-green, so that there is not the least excuse for riders. Cycling, moderately indulged in, is a good exercise, and affords excellent opportunities to town dwellers for visiting rural scenes, and filling their lungs with fresh, invigorating country air. But, to enable them to do the latter, it is expedient that the body should be erect, the ribs raised, the lungs expanded, and not cramped by the rider forming his body into an arc bent over the front wheel of his machine.

INSANITARY DWELLINGS are not always limited to the worst and most crowded quarters of towns and cities. Recently an opulent M.P. went into residence at his house, situated in a

principal fashionable part of the West End, having expended the huge sum of £180,000 in alterations and renovations. Almost immediately afterwards various members of his family were seized with alarming illness, apparently of an unaccountable character, until it was discovered that the drains were hopelessly out of order.

**DR. KOCH'S CURE FOR TUBERCULOSIS.**—Some of our contemporaries thought that we were pessimists of the deepest dye when we published in the February number of HYGIENE an article by Dr. Arthur J. Moss, entitled "Dr. Koch's Cure: A Word of Warning," and suggesting to British medical men the desirability of suspending their judgment for a while, instead of falling into the error committed by German and other enthusiasts of blindly praising a method still on its trial. But subsequent events have shown that Dr. Moss was in the right; and instead of the flattering reports which ushered in Dr. Koch's discovery, we now get unfavourable statements concerning "tuberculin." One of the most striking of these is from Mr. Jordan Lloyd, F.R.C.S., surgeon to the Queen's Hospital, Birmingham. This gentleman says that he has experimented with this lymph for more than two months, and that he has administered it in even larger doses than recommended by the Berlin professor. The conclusion at which Mr. Lloyd has arrived is that, in his hands, it has been absolutely useless in the treatment of chronic surgical diseases of all kinds, and, further, that no dependence can be placed upon it as a diagnostic agent—an advantage which was claimed for it at one time even by the more cautious observers, who doubted its remedial properties. Speaking on this latter point, Mr. Lloyd remarks that Koch's fluid is indubitably a liquid of very great power, as evidenced by the general and local disturbance

which attend its employment; but as a curative agent—and that was the aspect alone in which he spoke of it, for he had had no experience with it in the physiological laboratory—it was not worth the postage-stamps that were required to bring it over from Germany.

**THE MOTIVES OF SUICIDES** are strange, and afford material for psychological study. It was said that the late Sir Thomas Watson was called in to attend a gentleman at the West End who had attempted self-destruction. When asked his reason for trying to commit suicide, he replied, "I am tired of eating and drinking, dressing and undressing." Our excellent contemporary, the *Gentlewoman*, caps this story with the following:—Bored out man gets up in the morning. "What, I've got to wind up that beastly watch again? No! I'd rather die first." So, taking a pistol, he blew out his brains. This anecdote suggests to our mind a triple moral for those gentlemen of ease whose life has become a nuisance to them:—1. Wind up your watch overnight; or 2. Buy a keyless one; or (last though not least effective) 3, Find some useful occupation for mind and time, and live, not simply vegetate.

**INFLUENZA.**—The extensive recurrence of this epidemic in many parts of the provinces, and during the last two weeks in London, is creating much alarm. As pointed out in the special number of HYGIENE (reprinted in pamphlet form, price 6d.) published at our office, it is not unusual for a second outbreak to occur after a certain period. Up to now, the northern and eastern parts of the country have suffered most severely. Very high death-rates are reported from Sheffield, Hull, Halifax, and Preston. Ten deaths were registered in London last week as primarily due to influenza, in addition to which many deaths put down to bronchitis and other lung affections are attributable, secondarily, to influenza.

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## ANCIENT AND MODERN HEALTH RESORTS.

By DR. ALFRED J. H. CRESPI, Wimborne.

WHEN I was asked to write this article I was at some loss, for, to perpetrate an Irish bull, how should I bring it to an end? Modern health resorts! what an inexhaustible topic, needing for its proper treatment a volume rather than half-a-dozen pages; while, as for those of the past! what a field—vast, quaint, overflowing with interest! The pen might run on for hours describing scenes and people, with so little in common with our day that they almost belong to another order of existence. No such article could be written that did not draw freely on the works of the recognised masters of history, and of those still more popular writers who, not being so rigidly tied down by the stern logic of facts, time, and place, have greater facilities for reproducing the past—Froude, Macaulay, and Hume in one field, and Kingsley, Thackeray, Jane Austen, Boswell, and a host of letter and memoir writers in other fields. However skilfully done, such an article must necessarily resemble patchwork, and be made up of fragments torn from many different places—something like the sermons of a certain accomplished divine, whose wonderful though unequal eloquence had at last attracted general attention. It was

noticed that his dissertations lacked finish, and that a flight of rhetoric, which seemed to be very little connected with the preceding and following passages, would delight his audience. At last, one day, just under the pulpit, a venerable personage was seen sitting—a bishop, surely, or some musty old college don. The preacher commenced, and in a passage quaint but appropriate, marked out his ground: “South,” exclaimed the ecclesiastic, reflectively. In a few minutes the preacher was grandiloquently continuing, when the same clear voice was heard saying “Stillingfleet.” Another was heard “Barrow,” then “Latimer,” then again “Tillotson,” then “Butler.” Worn out by these repeated interruptions, the mortified preacher abruptly closed his manuscript, and dismissed as quickly as possible his astonished congregation. Something similar must be the following paper.

Most of us know something of the present condition of our watering-places, with their winter gardens, vast ranges of baths, broad, well-lighted thoroughfares, level and clean carriage-ways, and smooth pavements, their rapidly-extending suburbs of handsome villas, buried amidst beautiful trees and set off by neatly-kept gravel paths and flower-beds, resplendent with the rainbow tints of sunnier lands; but how few could take themselves back forty or fifty years, even in

imagination, and recall, if haply they were then alive, and belonging to the small class fortunate enough to travel, the little, ill-kept, shabby towns which were then the germs of some of the stately seaside and inland watering-places which delight our generation. Five-and-forty years ago, when the Duke of Argyll first visited Bournemouth, the Bath Hotel had been built, and about 2,000 people were living near it. That was the Bournemouth of his youth. As for Boscombe, which is rapidly becoming a place of great importance, there was no such town, and twenty years ago it was only a collection of a score of mean cottages. Where now thousands of noble villas are seen, there were, at the time of the duke's first visit, only a few plain, shabby-looking brick houses; the roads of those days were uneven, ill-made, and indifferently kept; the land in the valleys or chines was in great measure marshy and undrained; landscape gardening was undreamt of; in short, the development of our time had not commenced. The same was true of Malvern, Leamington, and, in less degree, even of Cheltenham and Clifton, and fifty other places. The older parts of our charming and pretty watering-places were, thirty years ago, closely built, somewhat dingy, and very unsavoury. I can just remember my first visit to Cheltenham; I was a tiny boy, and cried copiously when the groom, who had me in charge, left me on the Midland platform while he had a last glass of beer with an old companion. I can remember, too, that fields occupied much of the ground which is now overspread with noble villas and broad and leafy roads. Since my childhood many towns have been transformed, like the scenes of a pantomime, and have become magnificent, while the houses are now twice as large, four times as convenient, and sometimes fifty times as healthy.

But if instead of going back a quarter of a century we turn to Dickens, and read his descriptions of the Margate and Ramsgate of his

youth, and picture to ourselves the cumbrous coaches and slow journeyings which he described with a master hand, matters are even less like those we know. Further back still we can go to the times so brilliantly described by Macaulay in the third chapter of his unfinished fragment of a history, in a passage often quoted for its picturesqueness and beauty, but which, like every other masterpiece of literature, bears constant reproduction, and gains every time it is reperused.

"Vast has been the progress," he wrote, forty years ago, "of those towns where wealth is created and accumulated. Not less rapid has been the progress of towns of a very different kind — towns in which wealth, created and accumulated elsewhere, is expended for purposes of health and recreation. Some of the most remarkable of these gay places have sprung into existence since the time of the Stuarts. Cheltenham is now a greater city than any which the kingdom contained in the seventeenth century, London alone excepted. But in the seventeenth century, and at the beginning of the eighteenth, Cheltenham was mentioned by local historians merely as a rural parish lying under the Cotswoold Hills, and affording good ground both for tillage and pasture. Corn grew and cattle browsed over the space now covered by that long succession of streets and villas. Brighton was described as a place which had once been thriving, which had possessed many small fishing barques, and which had, when in the height of its prosperity, contained about two thousand inhabitants, but which was sinking fast into decay. The sea was gradually gaining on the buildings, which at length almost entirely disappeared. Ninety years ago the ruins of an old fort were to be seen lying among the pebbles and seaweed on the beach, and ancient men could still point out the traces of foundations on a spot where a street of more than a hundred huts had been swallowed up by the waves. So desolate was the place after this calamity that the vicarage was thought scarcely

worth having. A few poor fishermen, however, still continued to dry their nets on those cliffs, on which now a town, more than twice as large and populous as the Bristol of the Stuarts, presents, mile after mile, its gay and fantastic front to the sea. England, however, was not in the seventeenth century destitute of watering-places. The gentry of Derbyshire and of the neighbouring counties repaired to Buxton, where they were lodged in low rooms under bare rafters, and regaled with oatcake, and with a viand which the host called mutton, but which the guests suspected to be dog. A single good house stood near the spring. Tunbridge Wells, lying within a day's journey of the capital, and in one of the richest and most highly civilised parts of the kingdom, had much greater attractions. At present we see there a town which would, a hundred and sixty years ago, have ranked in population fourth or fifth among the towns of England. The brilliancy of the shops and the luxury of the private dwellings far surpass anything that England could then show. When the Court, soon after the Restoration, visited Tunbridge Wells, there was no town; but within a mile of the spring rustic cottages, somewhat cleaner and neater than the ordinary cottages of that time were scattered over the heath. Some of these cabins were movable, and were carried on sledges from one part of the common to another. To these huts men of fashion, wearied with the din and smoke of London, sometimes came in the summer to breathe fresh air, and to catch a gleam of rural life. During the season a kind of fair was daily held near the fountain. The wives and daughters of the Kentish farmers came from the neighbouring villages with cream, cherries, wheatears, and quails. To chaffer with them, to flirt with them, to praise their straw hats and high heels, was a refreshing pastime to voluptuaries sick of the airs of actresses and maids of honour. Milliners, toymen, and jewellers came down from London and opened a bazaar under the trees. In one

booth the politician might find his coffee and the *London Gazette*; in another were gamblers playing deep at bassett, and on fine evenings the fiddlers were in attendance, and there were morris dancers on the elastic turf of the bowling green. In 1685 a subscription had just been raised among those who frequented the Wells for building a church, which the Tories, who then domineered everywhere, insisted on dedicating to St. Charles the Martyr.

“ But at the head of English watering-places, without a rival, was Bath. The springs of that city had been renowned from the days of the Romans. It had been, during many centuries, the seat of a bishop. The sick repaired thither from every part of the realm. The King sometimes held his court there. Nevertheless, Bath was then a maze of only four or five hundred houses, crowded within an old wall in the vicinity of the Avon. Pictures of what were considered as the finest of these houses are still extant, and greatly resemble the lowest rag shops and pot houses of Ratcliffe Highway. Travellers, indeed, complained loudly of the narrowness and meanness of the streets. That beautiful city, which charms even eyes familiar with the masterpieces of Bramante and Palladio, and which the genius of Ansty and Smollett, of Frances Burney and of Jane Austen, has made classic ground, had not begun to exist. Milsom Street itself was an open field lying far beyond the walls; and hedge-rows intersected the place which is now covered by the Crescent and the Circus. The poor patients, to whom the waters had been recommended, lay on straw in a place which, to use the language of a contemporary physician, was a covert rather than a lodging. As to the comforts and luxuries which were to be found in the interior of the houses of Bath by the fashionable visitors, who resorted thither in search of health or amusement, we possess information more complete and minute than can be generally obtained on such subjects. A writer, who published an account of that city

about sixty years after the Revolution, has accurately described the changes which had taken place within his own recollection. He assures us that in his younger days the gentlemen who visited the spring slept in rooms hardly as good as the garrets which we have lived to see occupied by footmen. The floors of the dining-rooms were uncarpeted, and were coloured brown by a wash made of soot and small beer to hide the dirt. Not a wainscot was painted. Not a hearth or a chimney piece was of marble. A slab of common freestone, and fire-irons which had cost from three to four shillings, were thought fit for any fireplace. The best apartments were hung with coarse woollen stuff, and were furnished with rush-bottomed chairs. Readers who take an interest in civilisation, and in the useful arts, will be grateful to the humble topographer who has recorded these facts, and will, perhaps, wish that historians of far higher pretensions had sometimes spared a few pages from military evolutions and political intrigues, for the purpose of letting us know how the parlours and bedchambers of our ancestors looked."

Macaulay died when half the people now living were unborn, and he did not live to see the still greater comforts and still more astonishing advances of our age, and yet he described, with conscious pride, the towns of his day as he saw them, but which only persons bordering on fifty can distinctly remember. The towns as he loved to see them were cities of palaces compared with the mean houses of his childhood, and yet between the Bath, Cheltenham, Scarborough, and Leamington of his closing years, and the fair cities which we know, there is little in common beyond the familiar names. Some parts remain in the main the same: the Promenade at Cheltenham still exists little changed, with its grand old trees, its spacious hotel, and its beautiful shops; but then Cheltenham is old, though half of it dates from years subsequent to the battle of Solferino. Coming down to Ilfracombe, Bourne-

mouth, Worthing, Sandown, Harrogate, Ilkley, Malvern, and Buxton, and a host of others —what a transformation beyond the power of any pen! Cheltenham can never be mentioned without the thoughts dwelling on the famous men who have made it their abode; or who, at any rate, have been closely connected with it: among these Jenner is foremost. Charles James Fox during his residence in the town saw a great deal of him. His mind had been much prejudiced as to the character of cow-pox by Dr. Moseley, his family physician, and in his playful engaging manner he one day remarked, "Pray, Dr. Jenner, tell me of this cow-pox that we hear so much about. What is it like?" "Why, it is exactly like the section of a pearl on a rose-leaf." This comparison, not less remarkable for accuracy than poetic beauty, struck Mr. Fox very forcibly; he laughed heartily and praised the simile. On Cleeve Hill, in the midst of a wood, there is a summer-house which, according to an unreliable tradition, Dr. Jenner used to visit to get vaccine from the cows belonging to the farmers in the neighbourhood. Alpha House, on Bags Hill, he also used for gratuitous vaccination, but so strong was the prejudice on the first introduction of his discovery that these premises were for a long time known as the Pest House. Alpha House was afterwards used as a school by Mr. Wilderspin, a most zealous promoter of infant schools, who resided there a great many years. It has more recently been occupied by Mr. C. Norman, the proprietor of the *Cheltenham Examiner*. When I was a little boy I knew very intimately an elderly lady, now deceased, who when a child saw a great deal of Edward Jenner during the visits which her family paid to Cheltenham. She always described him as remarkably amiable and considerate, never losing his temper or showing annoyance under any provocation. On one occasion my venerable friend's mother, with Jenner's permission, put on her finger the ring which the Empress of

Russia had given him. It slipped on easily enough, but would not return, and the more she tried to get it off the more did the finger swell. She became agitated, and this confused her and made matters worse. "Never mind," observed Jenner, in his sweetest manner. "Try again, and if it won't come off we'll have it sawn through." This gave her confidence, and, greatly to her relief, another more skilful attempt got it off. Dr. Jenner was a most amiable man, whose life was passed amid the creations of nature and the study of a benignant and placid philosophy—a gentle spirit, full of tranquil thoughts and temperate impulses. In establishing vaccination he showed the wisdom of one well versed in the disposition of men, and the knowledge of such methods of procuring conviction as are most acceptable to the human mind. His letters prove him to have been of a retiring disposition, fond of rural solitude, and not caring for or seeking the excitement and publicity of great towns. Whatever may be the future of compulsory vaccination, and the possible loss of confidence in vaccination, the history of Edward Jenner will always be deeply interesting.

As recently as 1716, when the first spring was discovered, Cheltenham was only an obscure village. It gradually increased in size and importance till 1788, when the benefit that George III. was supposed to have derived gave it a great impetus, and it became a fashionable resort; but when my old friend, the friend of Jenner, was a young girl, in the first decade of the present century, it still had only 3,000 people, and I remember hearing her say that the countrywomen used to come in on market days bringing butter, poultry, and eggs; but on other days the supply of these necessaries was very limited. It was then little more than a village, with two or three streets, no more—and now!

Novelists approach their subject differently, and have more latitude than the historian, and the best pictures of manners are often found

in their pages; not that the novelist can draw on his imagination with the licence generally supposed. He must be true to life, character, and surroundings, and unless he is his works are without permanent value. Thackeray, in "Harry Esmond" and "The Virginians," perhaps the two finest historical novels in the language, described with consummate skill and fidelity the days of James and the early Hanoverian kings. Everyone remembers Colonel Harry Esmond, upright, benevolent, high-principled: everyone, too, must recall with totally different feelings Beatrix, haughty, proud, and worldly, fully conscious of the worth of the pious gentleman whom she venerated in her heart to the latest day of her sinful existence, although she preferred titled suitors who were not worthy to take off the colonel's shoes. I venture to reproduce two passages, somewhat long, I fear, which bear on the life and manners of the days when Tunbridge Wells was relatively far more important than now, and when the Pantiles must have been loathsome mean compared with their present splendour.

"Like worldly parents anxious to get rid of a troublesome child and go out to their evening party, Madame Bernstein and her attendants had put the sun to bed whilst it was yet light, and had drawn their curtains over it, and were busy about their cards, and their candles, and their tea, and negus, and other refreshments. One chair after another landed ladies at the Baroness's door, more or less painted, patched, brocaded. To these came gentlemen in gala raiment. M. Poellnitz's star was the largest, and his coat the most embroidered of all present. My Lord of March and Ruglen, when he made his appearance, was quite changed from the individual with whom Harry had made acquaintance at the White Horse. His tight brown scratch was exchanged for a neatly curled feather top, with a bag and grey powder, his jockey dress and leather breeches replaced by a rich and elegant French suit. Mr. Jack Morris had just such another

wig and a suit of stuff as closely as possible resembling his lordship's. Mr. Wolfe came in attendance upon his beautiful mistress, Miss Lowther, and her aunt, who loved cards, as all the world did. When my Lady Maria Esmond made her appearance, 'tis certain that her looks belied Madame Bernstein's account of her. Her shape was very fine, and her dress showed a great deal of it. Her complexion was by nature exceeding fair, and a dark frilled ribbon, clasped by a jewel, round her neck, enhanced its snowy whiteness. Her cheeks were not redder than those of other ladies present, and the roses were pretty openly purchased by everybody at the perfumery shops. An artful patch or two, it was supposed, added to the lustre of her charms. Her hoop was not larger than the iron contrivances which ladies of the present day hang round their persons, and we may pronounce that the costume, if absurd in some points, was pleasing altogether. Suppose our ladies took to wearing bangles and nose-rings ! I daresay we should laugh at the ornaments, and not dislike them, and lovers would make no difficulty about lifting up the ring to be able to approach the rosy lips underneath. As for the Baroness de Bernstein, when that lady took the pains of making a grand toilet she appeared as an object handsome still, and magnificent but melancholy, and even somewhat terrifying to behold. You read the past in some old faces, while some others lapse into mere weakness and content. The fires go quite out of some eyes as the crow's feet pucker round them ; and they flash no longer with scorn, or with anger or love ; they gaze, and no one is melted by their sapphire glances ; they look, and no one is dazzled. My fair young reader, if you are not so perfect a beauty as the peerless Lindamira, Queen of the Ball—if at the end of it you retire to bed, you meekly own that you have had but two or three partners, whilst Lindamira has had a crowd around her all night—console yourself with thinking that at fifty you will

look as kind and pleasant as you do now at eighteen. You will not have to lay down your coach and six of beauty and see another step into it, and walk yourself through the rest of life. You will have to forego no long-accustomed pleasures, you will not witness and own the depreciation of your smiles, you will not see fashion forsake your quarter, and remain all dust, gloom, and cobwebs within your once splendid saloons, with placards in your sad windows, gaunt, lonely, and to let ! You may not have known any grandeur, but you won't feel any desertion. You will not have enjoyed millions, but you will have escaped bankruptcy. 'Our hostess,' said my Lord Chesterfield to his friend, in a confidential whisper, of which the utterer did not in the least know the loudness, 'puts me in mind of Covent Garden in my youth. Then it was the court end of the town, and inhabited by the highest fashion. Now, a nobleman's house is a gaming-house, or you may go in with a friend and call for a bottle.'"

And, again, another striking passage : "Cousin Maria made her appearance, attended by a couple of gardener's boys bearing baskets of flowers, with which it was proposed to decorate Madame de Bernstein's drawing-room against the arrival of her ladyship's company. Three footmen in livery, gorgeously laced with worsted, set out twice as many card tables. A major-domo in black and a bag, with fine laced ruffles, and looking as if he ought to have a sword by his side, followed the lacqueys bearing fasces of wax candles, of which he placed a pair on each card-table, and in the silver sconces on the wainscoted wall that was now gilt with the slanting rays of the sun, as was the prospect of the green common beyond, with its ricks and clumps of trees and houses twinkling in the sunshine. Groups of many-coloured figures in hoops and powder and brocade sauntered over the green, and dappled the plain with their shadows. On the other side, from the Baroness's windows you saw the Pantiles, where a perpetual fair was held, and

heard the clatter and buzzing of the company. A band of music was here performing for the benefit of the visitors to the Wells. Madame Bernstein's chief sitting-room might not suit a recluse or a student; but for those who like bustle, gaiety, a bright cross-light, and a view of all that was going on in the cheery, busy place, no lodging could be pleasanter. And when the windows were lighted up, the passengers walking below were aware that her ladyship was at home and holding a card assembly, to which an introduction was easy enough. By the way, in speaking of the past, I think the night light of society a hundred years ago was rather a *dark* light. There was not one wax candle for ten which we now see in a lady's drawing-room, let alone gas and the wondrous new illuminations of the clubs. Horrible guttering tallow smoked and stank in the passages. The candle snuffer was a notorious officer in the theatre. See Hogarth's pictures: how dark they are, and how his feasts are, as it were, begrimed with tallow. In 'Marriage a la Mode,' in Lord Viscount Squanderfield's grand saloons, where he and his wife are sitting yawning before the horror-stricken steward when their party is over, there are but eight candles—one on each card table, and half a dozen in a brass chandelier. If Jack Briefless convoked his friends to oysters and beer in his chambers, Pump Court, he would have twice as many. Let us comfort ourselves by thinking that Louis Quatorze, in all his glory, held his revels in the dark, and bless Mr. Price and other luciferous benefactors of mankind for banishing the abominable mutton of our youth."

I can never read Thackeray without a feeling of deep gratitude that I have been permitted to live in an age which boasts among its brightest gems that long series of splendid works in which, not unkindly, not bitterly, he has depicted human nature. Alas! poor human nature! So full of pretence, of petty meanness, of unworthy motives, so ashamed of its

iniquity, so full of contempt for itself, so helpless to amend its ways! What would our literature be without Scott, Thackeray, Dickens, Lytton, and George Eliot. Our profoundest sermons are to be found in the pages of our great masters of fiction.

Not more startling than the change in the arrangement and appearance of our towns is that in the manners of all classes. One can never read without surprise the passages in "Woodstock," in which Scott represents, and with absolute fidelity to the customs of the age, gentlemen of position receiving small sums of money from their social superiors. What should we think were the Duke of Cambridge, in complimenting the commanding officer of one of the three regiments of Horse Guards to emphasise his praise with a few golden sovereigns? And yet, two centuries ago, something very similar would not have been singular.

What first drew attention to the value of a visit to certain health resorts? Who can say? Some, like Bath and Buxton, are survivals of Roman times; others have become famous from the beauty of their surroundings; some through advantages of climate, soil, or vegetation; others were made by the fame of the recovery or residence of some monarch or illustrious writer or statesman; and others, again, owe their reputation to the lavish expenditure and perfect sanitary arrangements of our day. Hundreds of pretty villages could be transformed into much frequented health resorts were money laid out unsparingly and wisely. Modern public requirements are exacting, and patient labour and ungrudging profusion are necessary. This is as it should be. No one now would care to pass a holiday in one of those pestiferous dens, which a couple of generations ago were called lodging-houses. We demand something better. We may be more luxurious, more effeminate, or we may more thoroughly understand the value of good surroundings and uncontaminated air and water. However that be, it is no easy matter to make a good watering-place fully abreast of the requirements of the age.

That word *watering* reminds one that many health resorts became such because of the springs, often of warm water, which they possessed, and that calls attention to the reputation the bath has had in the cure of disease from time immemorial. Bathing goes back to remote antiquity, and the oldest records mention it. Among the Egyptians it was practised as a religious rite, and a wide-spread belief obtained in former ages that bodily cleanliness was somehow mysteriously associated with high morals or spiritual purity. That was when the matutinal tub was unknown. Some authorities contend that Moses in making the bath a religious rite had in view the prevention of the contagious diseases so fatally prevalent in hot regions. The Mosaic law prescribed, in some cases, the use of running water. In Palestine the richer Jews had private baths in their houses and bathing ponds in their gardens—an arrangement which is said to continue to this day. In addition public bathing places abounded. The Greeks early took delight in bathing, and Homer alludes to it. We have no detailed account of the arrangements prevailing among them, and there are some difficulties in learning much about those of the Romans. The religious or ceremonial uses of bathing in some countries were soon forgotten, and the bath became a luxury, or rather, as all who have had much experience of it pushed to extremes know to their cost, a most enervating and unhealthy amusement.

The ancient bathing-places near the Abbey Church at Bath, which have recently been brought to light, and which are being visited from curiosity by many antiquaries and strangers, are singularly grand and almost perfect; but how little they resemble modern suites of bathrooms in any great hydropathic establishment. Arrangements which the Romans would have called luxurious to a degree we should regard as comfortless and mean; surroundings which consuls and praetors would have thought everything that their wives and daughters could

desire, we should hardly like to condemn our servants to. We live in a wholly different world, with ten times the comforts of the near past. For us time and distance no longer exist. The tropics yield us their choicest productions; the most favoured regions rob themselves to add to our enjoyments; life is as agreeable in a small watering-place 400 miles from the metropolis as in the greatest centres of civilisation and wealth. In the march of improvement all classes participate. A generation ago, at the commencement of the Crimean War, visitors to a health resort generally had to go part of the way by coach, and to find lodgings on their arrival. Postal facilities were then immeasurably inferior to those we know; telegrams were dear and consequently rare; splendid institutions for the reception of the sick and the whole were few or non-existent. In a place like Malvern there might be half a dozen. Hotels were small and dingy, and as for sanitary arrangements the less said of them the better. Amusements were hardly dreamt of, and visitors often regarded a residence as a kind of rural camping out, when they had to forego the comforts of home and to endure many privations. Perhaps in some respects matters were more natural, and a stay at Buxton a more decided change, and yet few would like to go back to those times. And now we have a bewildering choice of watering-places, large and small, new and old, near and remote, cheap and dear, all admirably supplied with train, postal, and telegraph service, all with skilled medical practitioners. Most present a bewildering profusion of hotels, while large and small hydropathic and invalid establishments abound, sometimes so immense as to be able to accommodate hundreds of inmates. These modern establishments are self-contained. The baths, the amusements, the dining-rooms, the excursions, the social intercourse, the skilled medical attendance, leave nothing to desire. Houses they are not, but little towns, offering attractions that no person, however wealthy, can

command under his own roof ; and the month in such a house is often looked forward to and looked back upon as the brightest of the whole year.

Whether the future will show as much progress as the past half-century, I cannot positively say, but I do not see why it should not. When in the course of my first visit to Cheltenham, thirty years ago, I went out in the long summer evenings, holding my father's hand, he used to say with conscious pride that Cheltenham had reached the *ne plus ultra* of perfection, and that it was simply magnificent ; and friends far older than my father, who was even then an old man with snow-white hair, often remarked that the place had become a city of palaces, although half the largest houses date from still more recent times than my childhood. Human progress is continuous, and in nothing more marked than in improved houses and greater luxuries. We may live to see still greater perfection and splendour, and the health resorts of our old age may as much eclipse those we are now familiar with, as the latter transcend those of our grandfathers' youth.

#### PATENT MEDICINES.—No. 7.\*

*Correspondence concerning Holloway and Mattei.—Allen's World's Hair Restorer; Mexican Hair Restorer; Singleton's Golden Ointment; Rowland's Kalydor; Gowland's Lotion for the Skin.*

#### LETTERS SAVED FROM THE WASTE-PAPER BASKET.

##### 1.—CONCERNING HOLLOWAY.

Dublin, May 11th, 1891.

Sir,—I am *out of patience* with such abominable articles as you have inserted in your paper about what you are pleased to call

\* The object of this series of articles is to give a complete account, with analyses, of the principal patent or quack medicines, and especially to bring about such a change in the Law of Patent Medicines that it shall become imperative upon their manufacturers to affix to every bottle or box in which these preparations are contained, a descriptive label fully setting forth the ingredients composing them. This regulation works admirably in various Continental countries. A systematic *exposé* of quack medicines

quack medicines. Do you not know that the late esteemed Professor Holloway was a gentleman of the *highest* character, and that he founded several institutions of *almost national* importance ? You may not *know all this*, but I do, and I am *proud* to say that I have a near and *dear* relative who has *enjoyed* the benefits of the Holloway College at Egham. And don't you know that one who bears the *honoured* name of Holloway has been knighted by Her Majesty?—Yours indignantly,

A LADY.

##### 2.—FROM A MATTEIST CHAMPION.

Pisa, May 16th.

Sir,—Chance has thrown the March HYGIENE in my way. I know something about the Mattei remedies, so I will give you the impression your article makes on a common-sense man of the world.

Without wishing to appear abusive, I must say such an article is a reflection on your honesty, common sense, and capacity as editor of a paper. 1. *Honesty.* Is it honesty to denounce as sheer humbug a system of which you *know nothing*? You pin your faith to Mr. Stokes' analysis of the "Electricities," but you *don't even try the remedies*, and you condemn them beforehand. What good are your assertions without proofs? Prove that they do no good or do harm, and people will listen to you; otherwise, they will think you belong to the great conspiracy to silence any new remedy not brought out by the doctors. Let me add, too, that I know a doctor who analysed the "Electricities" and *fancied* they were prepared from fungi, to which idea the smell and the growths that develop in them might give colour.

2.—*Your common sense.*—Do you believe your little *ipse dixit* will stop people trying Mattei? We English are too practical and prefer being cured by quacks to being killed by the faculty. What an idea you must have of the mental capacities of your readers (mostly Carlyle's fools (?)) if you imagine you can keep them off the forbidden Mattei territory by calling him a humbug.

3.—*Your commercial capacity as the Editor of a Paper.*—"Hygiene" looks a useful kind of publication, but the line you have taken up would quite discourage myself and most others from taking it in.

has never before been attempted, and therefore, while thanking many friends who have given us encouragement in our task, we feel that we may reasonably ask for a continuance of their co-operation and support, and for any information bearing upon the subject. No. 1 (December issue of HYGIENE) contained an article on Mattei's Electro-Homœopathic Remedies; No. 2 (January, 1891), on Clarke's Blood Mixture; No. 3 (February), on Chlorodyne and other opiates; No. 4 (March), Du Barry's Revalenta Arabica; No. 5 (April), Sequah's Oil and Prairie Flower Mixture; No. 6 (May), Holloway's Pills and Ointment. In addition to the descriptions and analyses of these preparations, the articles will be found to contain a variety of interesting matter concerning quacks and quackery.

Such a paper ought to be a "*Seeker after Truth.*" You contemptuously relegate Mattei and his well-known and authenticated cures to the same category as other special remedies. We have all known about Lentils and Clarke's Blood Mixture for years, but I do not know that either have claimed to cure cancer, or anything but what diet or purifying medicines might be supposed to do. But here is a distinctly new system, a development of Homœopathy, which, without taking the trouble to inquire into, you dismiss into limbo with Revalenta Arabica, &c. "If the blind lead the blind, indeed," &c.

As you are so totally ignorant of the subject you dilate upon, it may be news to you that two Nice doctors claim to have found out the composition of Mattei's remedies, and call it complex Homœopathy. They cure the same diseases with the same remedies they manufacture themselves, and give the formulæ. Thus: Blue electricity is composed of aconite, digitalis, secale, belladonna, white hellebore, pulsatilla, arnica, hamamelis.

In conclusion, I, who was not a believer for years (as I expected the remedies to act at once, and gave them up several times), have by perseverance for a few months completely lost neuralgia and tic, that made life unbearable, and that no Tonga or allopathic remedies could touch. I have been now free *for two years*. I have a sister who has been completely cured of rheumatic gout at fifty-eight (hereditary, and of two or three years' standing). Her doctor, an allopath (who is a sceptic), says he has given no medicine, allowing her to take Mattei if she liked, only dieted her, but that the fact remains that she has now no need of going to Royat *every year*, as he believed would be necessary. She has been perfectly cured for more than a year without any mineral waters, and has been told by him that she has now no need of *any* waters. Of course you will turn a deaf ear. Doctors think it a grievance, I know, that we should be cured by quacks instead of dying "*en symmétrie*," according to the rules and regulations of the Pharmacopœia and the Royal College of Physicians. But common sense people, in consequence, are beginning to be homœopaths or Matteiopaths, and you cannot wonder at it. We are beginning to resort to the faculty only for surgical cases, in which they are proficient.

#### COMMON SENSE.

3.—FROM THE WRITER OF THE PREVIOUS LETTER.  
Postmark, some days later:—

I forgot to add to my letter the other day that I knew a case of *lupus* that for seven years had been submitted to all the "comités" of the profession without any result; the poor patient had, indeed, suffered many things from physicians. Three months of the Mattei treatment *cured it completely* to the surprise even of the homœopathic doctor who used the remedies in this disease for the first time. She had gone about in a veil before; now her face can be seen, and the remedies are humbug!

You say in your March number that you receive

abusive letters, but do you not feel that your article, imputing fraud to Mattei is abusive? Not only abusive, I should say, but libellous; and abuse naturally generates abuse. I hope my abuse has been restrained by gentlemanly feeling, but it is difficult for "*those who know*" to write in cold blood to people like yourself who, *knowing simply nothing*, and not even taking the trouble to test a single remedy, sit down in an editor's chair and pronounce an *ex cathedrâ* judgment, that it is all a humbug and a fraud! I wonder you cannot see that a paper conducted on such principles can never go down with people who have a grain of common sense or reflection. We should be thankful to you if you would unmask Mattei by *proving* his fraud; but that is the last thing that occurs to you.

In Italy the Mattei system is almost unknown, and why? Italians are *theoretical, not practical*, and they take for granted allopathy, or even homœopathy, is the right thing, consecrated by a certain tradition. The reason, I imagine, why Mattei is so successful in England is, that to us "an ounce of fact is worth a pound of theory." English people have tried for themselves, and will, in spite of your fulminations; and till you can bring some *facts*, your theory about the Mattei system will be thrown into the waste paper basket, as it deserves. Can you not see this?

#### COMMON SENSE.

P.S.—You probably wish us to think that your zeal against Mattei is prompted by care for our health and interests. In the face of the *shameful* bolstering up of the St. Bartholomew's Hospital authorities by twenty physicians, we cannot believe it for a moment. It is all a matter of *esprit de corps*—anything rather than admit a failure. Mr. Labouchere, who has dealt such a crushing blow to the credit of the faculty (when they give opinions, as you do, *ex cathedrâ*), is, by the irony of fate, an allopathist, and believes that the "Electricities" are water, as you do; but he is a man of the world and common-sense, and sees humbug in other systems besides Mattei's.

I ask you to excuse my frank speaking, but parsons and doctors may be all the better for hearing what common-sense thinks about their fads and vagaries, and you have provoked this letter by boldly charging Mattei with fraud.

P.S. 2.—I daresay you have never compared your position with that taken up by the Pope—*Extra ecclesiam nulla salus*, which you probably think the height of imbecility. Well, to reflecting people the ordinary physician is in the same boat. Any *pathy* except his own *pathy* is humbug or fraud. Were the Saviour to come again and work miracles of healing in your sight, if He could not produce a diploma of the Faculty you would pronounce them humbug, if not fraud. "Prove all things" would be the motto I would suggest for the Royal College of Physicians—an order as much needed as parsons for our poor humanity, but as liable to be carried away into every extravagance by prejudice and tradition.

Whatever our readers may think of our occupying so much space by publishing these letters—a fair sample, we may state, of the correspondence which our articles on quack medicines have brought upon our devoted heads—they will not, at any rate, even suspect us of any attempt to convert HYGIENE into a “Polite Letter Writer.”

Having printed these letters we will briefly comment on them; but, before doing this, we must remind our numerous correspondents that no notice can in future be taken of any letters which do not give the names and addresses, not necessarily, of course, for publication.

“Place aux dames,” so that we will refer to “A Lady’s” communication first. Both she and “Common Sense” are very much “in the know,” judging by their frequent use of the word, emphasised by plentiful italics. We cannot altogether accept the plea of ignorance with which our lady correspondent has thoughtfully provided us; and though we learn with a suitable degree of satisfaction that her relative has profited from the posthumous benefits conferred by the late Mr. Holloway, we are not prepared to admit that the honour of knighthood conferred on the present head of the firm of pill-makers has elevated quackery into science, or modified the fact that Mr. Holloway “made his pile” by the pertinacious and persistent puffery and exaggeration of the value of his wares. The “almost national” importance of the institutions founded with part of the money thus amassed is a question which we will not stop to discuss; there was one institution which Holloway desired to found, not the least appropriate, perhaps, and that was an asylum for lunatics and idiots. We do not know, as the lady would say, but we can form a shrewd guess why this wish of Mr. Holloway was not carried out. After all, our fair correspondent has advanced no sounder argument in his favour than that used by Lucetta in “The Two Gentlemen of Verona,” “I have no other but a woman’s

reason; I think him so, because I think him so.”

Without wishing to appear abusive, the author of the letters Nos. 2 and 3 has succeeded beyond his desires or expectations, and we regard his double-barrelled attack, with the double-barrelled P.S., as a pretty good proof that the shafts aimed at Mattei’s imposition have hit, at least, some of his followers. It would seem that our correspondent looks upon common sense as a rare quality, limited to himself and other Matteists; while he advances the illogical argument that the circumstance of a man having devoted special study to any particular branch of knowledge wholly disqualifies him from coming to any right opinion thereon; although our correspondent, with the aid of the common - sense which he superabundantly possesses, if we take his *ipse dixit*, is competent to bring to bear on any subject a soundness of judgment that even an Admirable Crichton would shrink from laying claim to. How cleverly, too, he works in his similes! Scarcely have we got over the contrast of our humble selves with the Pope, than the artfully simple, or simply artful, comparison of Mattei with the Saviour is adroitly introduced. As for our knowing nothing of Mattei’s remedies, “Common Sense’s” assumption is incorrect, for it happens that twelve months ago our attention was directed to these preparations by General Booth’s asking our opinion concerning them, in the course of a conversation about Mrs. Booth’s illness. It was apparent to us—as Mr. Stead confirms in his panegyric on Mattei—that the General had no great faith in the “Electricities”; but we availed ourselves of subsequent opportunities to put the Mattei remedies to practical tests. The results were so unsatisfactory that we were not surprised when Mr. Stokes, after submitting the “Electricities” to rigid analysis, announced that the samples sent to him, just as they were purchased from the London agents, consisted only of water. Water, “honest water,”

as Shakespeare writes, to what base uses may you not be brought! And, because we say that so long as Mr. Stokes' analysis is not disputed, so long as Mattei contents himself with vague assertions, we shall continue to regard him as a humbug, "Common Sense" avers that we are not only abusive, but libellous. Well, notwithstanding "Common Sense's" statement that the Italians are not a practical people, Mattei is, according to Mr. Stead's showing, making an income of at least £100,000 a year, and if he is practical enough (or foolhardy enough) to bring this question of libel to an issue, we are willing to meet him in a court of law.

Our object in these articles is to expose quackery, whether of British or exotic growth; and it would be easier for "Common Sense" to restore the Leaning Tower, for so many years constituting the chief attraction of the city in which he dwells, to the perpendicular, than it would be for him to indoctrinate us with his obvious predilection for charlatanry.

There is a story told of a gentleman who, passing along a street of a manufacturing town, was so astonished at the spectacle of a little woman vigorously punching a big "navvy" in the back, at the same time using most angry language, without any attempt at resistance or remonstrance on the part of the recipient of the blows, that he could not avoid speaking to the man. The good-humoured giant turned round towards the gentleman, and, removing his pipe from his mouth, observed, with a broad smile on his face, glancing down at his diminutive and irascible spouse, "It's all right, sir; it pleases her, and it don't hurt me." In like manner it may please "Common Sense" and others to pitch into and abuse the medical profession, while it certainly does not hurt or disturb the equanimity of the latter.

We have already referred in these articles to the promptitude with which quacks assert that their nostrums will cure every ill under the sun. Universality is their great aim, as em-

bodied in the advice given by an American patent medicine manufacturer to a relative of his who was about to embark in a similar business: "Recommend the stuffs internally, externally, and eternally."

Holloway's Pills and Ointment afford a good illustration of the extent to which this advice can be carried. The "boon and blessing to every family," which one sees advertised at every railway station, consist of aloes and rhubarb, with some still less important constituents, to be administered internally; and an ointment composed of lard, oil, wax, turpentine, and resin, for external application; whilst the constant and persistent advertising of these nostrums may be regarded as carrying out the third condition laid down by the successful Yankee quack. Anyone acquainted with even the most elementary rudiments of pharmacy and medicine must, of course, see that there is nothing of a specific—far less of a marvellous—character amongst the ingredients we have enumerated; yet Holloway's advertisements assert that these two quack preparations will promptly and certainly cure every disease, from asthma right down through the alphabet. We wonder whether the Bishops and other bigwigs who manage the affairs of the Holloway College ever give five minutes' thought to the questionable means and despicable disregard for truth by which the money was amassed that enabled the founder of the College to leave after him a perpetual memorial of Holloway's Pills and Ointment and of human gullibility. *Monumentum aere perennius* might in this instance be translated, "A monument more lasting than the brazen assertions of its founder." Some months ago, when General Booth was raising the special Salvation Army fund, one of his opponents tried to trip him up by asking whether he could conscientiously accept money in aid from unbelievers and other unworthy persons, referring to some whose names had appeared in the lists of subscribers. To this the General

replied that if the Devil himself should send him a donation he should not hesitate to accept it and apply it to the purpose in view. The moral of this is: Blind your eyes as to the source whence the money is derived; and it is apparently acted up to by the trustees of the Holloway College, as it was by Mr. Charrington, who carried on an active Temperance crusade at the East End of London with money derived from his share in the great brewing business of Charrington and Co., situated in the Mile End Road.

In a previous paragraph we spoke of quack preparations for external employment. Even the most highly vaunted and most widely advertised of these turn out of a very ordinary character when submitted to the close scrutiny of the analyst. We append the analyses of some of these.

1. *Allen's World's Hair Restorer*.—An eight ounce bottle contains  $75\frac{1}{2}$  grains of sulphur, and 87 grains of acetate of lead. Considering the low commercial value of these two drugs, the most expensive however to be found in the preparation, the price at which it is sold cannot fail to give a very handsome return to its proprietors. If it were of corresponding value to persons who fondly and foolishly imagine that luxuriant crops of hair will adorn their smooth, shiny scalps as the results of its persistent application, the charge made for it would, of course, be a different thing altogether.

2. *Mexican Hair Restorer*.—The foregoing remarks apply to this nostrum, which is as much overrated as it is advertised. It consists of acetate of lead one part, precipitated sulphur 4 parts, glycerine 30 parts, and water 160 parts. The only ingredient capable of promoting capillary growth is the glycerine, and that is so completely swamped with water in the proportion of nearly five to one, as to be rendered inert.

3. *ingleton's Golden Ointment for the Eyes*.—Golden only in name, for it contains not the faintest trace of the precious metal. As a

matter of fact, it is practically identical with the nitric oxide of mercury ointment of the old pharmacopœia, sometimes efficacious in cases of ophthalmia, but in the majority of instances of eye diseases worse than useless. It is unfortunately much easier to tamper with the eyes than it is to remedy the mischief resulting from indiscriminate and injudicious treatment.

4 and 5. *Rowland's Kalydor, and Gowland's Lotion for the Skin*.—Mr. Henry Beasley, a good authority, and a voluminous writer on all matters connected with pharmacy, states in his "Druggists' General Receipt Book" that either of these well-known cosmetics, so dear to the fashionable and vain amongst our lady friends, may be imitated as follows:—Bitter almonds, blanched, 1 ounce, corrosive sublimate, 8 grains, rose-water, 16 ounces. In the last (ninth) edition, he says that on more recently examining a sample of Kalydor, he could not find any mercurial ingredient, so that the corrosive sublimate has wisely—let us hope, permanently—been eliminated.

THE EDITOR.

## EXERCISE AND ATHLETISM.

### USE AND ABUSE.\*

By R. CLARK NEWTON, L.M., C.M., M.R.C.S.

(Concluded from page 136.)

*Football*, as you know, has become very popular in many parts of England, especially in the North. I find no exercise or game whose good and bad points are so hotly debated. I am not going to absolutely condemn football as a game that should not be played at all, but its practice requires complete revision. I do not wish to trouble you with theories, but I want to place results before you; and I have this statement to make—that in my practice, as a medical man, I see more persons injured by football than by all the other games or forms of exercise put together. You know that since

\* A lecture delivered to the members of the Health Society, Newcastle-on-Tyne.

the season began there have been four deaths already on the football field ; but four deaths in actual play give little or no indication of the numbers that have been fatally injured, and who have died in their beds, and of the enormous numbers who find themselves in after-life permanently disabled. It is more likely to be injurious than any other game, because it is a rough-and-tumble sport, with calls for sudden and enthusiastic effort ; and so we have pressure on heart and lungs, with the risk of heart and lung disease, as well as broken shins, arms, heads, and legs—and sudden death.

All these dangers would be lessened by the adoption of the Association game, and the elimination of the professional element. Many football clubs are composed entirely of professionals, who take so much as £5,000 to £6,000 in gate-money during the season ; and then, this professionalism inculcates in the minds of men the idea that the game must be won at any cost, and so exercise is prostituted to the level of a business, a means of livelihood, and the working-out of selfish interests. A football player writes to me on this game as follows. After reminding me of the constantly occurring accidents on the field, he remarks—" You see enough in our newspapers, and hear more from football friends of the brutality and stern vindictiveness of many of our players. You see a man of middle height and powers neatly elude the charge of one much stronger and bigger than himself and nicely walk off with the ball, to the chagrin of his bigger brother ; and then comes a meeting later in the game, when the bigger man brutally hurls his former opponent into the air, or upon the ground, giving rise, perhaps, to some life-long injury." On the other hand, football can be played in winter, when many other games are prohibited ; it is not expensive, and, if properly played, certainly teaches patience, endurance, and self-control ; lessens vanity and disciplines the temper, and develops a man's sense of fairness, honour, and manliness.

An evening might be spent in discussing football, but as time presses, I must pass on to *Lawn Tennis*.

Here we have an exercise continuous rather than violent, combined with every variety of muscular movement, and demanding the use of the mental powers all through the game. I think I may safely say that tennis calls into action all the muscles of the system, and that is an all-important point. Just watch the player ; you see how much he uses his arms when swinging his racket in all directions, forwards, backwards, and sideways, whilst he bends his body in stooping to catch a low ball ; now leaping into the air to secure a high one, at the same time his legs are in continuous motion, so that he may be wherever the ball happens to be travelling. The periods of great muscular exertion are never very prolonged, and the moments of comparative rest are many. It has one very great advantage—here women may meet men on something like terms of equality. The brother may be beaten by his sister, and the husband by his wife. Women have recently taught the world that they are not intellectually weaker than men, by taking the highest University degrees with honours, and they would have done so long ago had they had the opportunity, and had it been the fashion to do so. And from the way they play tennis they seem about to teach us that, given time and fair play, they will be little inferior to men in physical powers. There exists a race in Africa whose custom it is for the men to stay at home and mind the baby, whilst the woman goes forth to hunt the family dinner. These men are puny and effeminate, whilst the women are strong and muscular. Long and steadily may women play tennis ; they will find it more profitable than the study of genteel deportment, and its extensive adoption by our sisters will leave its impress upon the nation's present and future physical strength. But I must ask them to play in woollen material, so as to avoid chills, and not to cripple themselves with tight boots or com-

pressed waists, for to indulge in this or any exercise without giving the lungs plenty of room to expand is to waste your time and injure your health. The dangers of tennis are few, and seldom fatal. The well-known "tennis-elbow," "tennis-wrist," &c., are injuries that usually recover under rest and treatment.

I regret that time prevents my saying much relative to the need and advantage of exercise for children, but I would have you bear in mind that our boys and girls grow into our men and women, and that many of the troubles of manhood would have been avoided had the child's physical vigour been developed—say, its back straightened and its chest strengthened by judicious drill.

What is the end of your highly-educated child, that has had its head more than filled, if its physical degeneration, or ill-development, renders it all unable to bear the strain of life when manhood is reached? Curiously as our heads have had more than sufficient attention of late, the public has recognised the need of making games compulsory in all schools, and that these games should be superintended by a teacher. Now I think some form of exercise should be compulsory upon all children, in all schools, for we must not overlook the fact that muscular use means mental recreation. The healthy boy has a lot of animal energy to expend in some way, and he must not be allowed from choice to loaf about, instead of joining in the school games. Such a lad becomes the school-bully, and he will lounge all through life, because he has been allowed to be self-indulgent and idle. I would especially enforce that every school should supply regular drill, and that every pupil be taught to swim. The gymnasium should be at hand, and such games as cricket, tennis, and football freely allowed. Boys up to fifteen can certainly play football without danger to themselves, if sorted according to their age, and if carefully superintended by a teacher. Up to fifteen a boy's sinews, muscles, and blood-vessels are so elastic that he can

scarcely injure himself at football (and here I speak from experience), for accidents under such circumstances are few indeed.

And now I think I have detained you too long, and yet I have but touched the fringe of our subject. On my part, I will be satisfied if I have brought home to you the value of individual exercise. What an antidote you have in it against the increasing head work that society, in its present state, calls you to perform, and how indispensable it is for all patriotic Englishmen to maintain that muscular strength which history has shown to be necessary to the permanent existence of a nation of the first power. This seems to me to be a subject well worth the attention of a Health Society, especially as we are resident in a large manufacturing city; for the fact that, in such cities as ours, the average male is surely and gradually deteriorating in stature and weight as compared with the surrounding district, is ever claiming the attention of the thoughtful. And then, too, a people that loses physical vigour becomes more prolific, and so the evil of the nation's degeneration is aggravated.

#### BRITISH HEALTH RESORTS.\*—No. 13.

##### THE CLIMATE AND SURROUNDINGS OF BOURNEMOUTH.

By DR. CRESPI, Wimborne.

THE charming little paper on Bournemouth which that exemplary clergyman, the Rev. R. A. Chudleigh, of West Parley, Wimborne,

\* The object of this series is to direct attention to the merits of different British Health Resorts, too often overlooked and neglected by persons who are put to much expense, trouble, and loss of time, in visiting Continental Spas, instead of availing themselves of facilities open to them in their own country. No. 1, Hastings and St. Leonards; No. 2, Cornwall; No. 3, Droitwich and its Brine Baths; No. 4, Swanage; No. 5, Isle of Man; No. 6, Lowestoft; No. 7, Llandrindod; No. 8, Rostrevor; No. 9, Cromer and Yarmouth (Norfolk), and Rye and Camber (Sussex); No. 10, Brighton; No. 11, The Undercliff, Isle of Wight; No. 12, Bournemouth, by Rev. R. A. Chudleigh. Any single number can be had post free by remitting seven stamps.

has contributed to the March issue of HYGIENE, tempts me to supplement it with a few facts and figures that cannot but be of value to many of the people who are thinking of trying Bournemouth for their summer holidays this year, and of exploring the surrounding country; and the latter, especially near Wimborne, is of extreme loveliness and interest.

Perhaps nothing so increases the beauty of the country as an abundance of trees; and in this matter the streets of Bournemouth are remarkable—they look in places like shady lanes, so that the visitor might almost fancy himself in the open country, far from the turmoil of common existence. Where could you find landscapes more smiling and solitude more seldom broken in upon than on the vast heaths and far-reaching woods and parks which surround Wimborne on every side? Country lanes and fields—in short, the whole open country—are, in all probability, more deserted now than formerly; and many high roads, along which we might wander for hours scarcely meeting half-a-dozen persons, except in or near villages or towns, were once the great national arteries, along which carts, coaches, horsemen, and foot passengers flowed in a continuous stream to all parts of the kingdom. Now all is changed. The railway has usurped the place of the old road, which, fortunately for the lover of nature, is seldom trodden. But, though it preserves the seclusion of the country, there has been a lamentable drifting of the population into the great cities and ports, and the rural districts are less traversed, less frequented, than fifty or even a hundred years ago. I have walked thousands of miles along grass-grown lanes and roads, and passed through hundreds of villages, even close to important towns, where the solitude was unbroken.

Talk of the stony wilderness of London, where the weary outcast may find seclusion which no one will care to disturb! a solitude far more soothing and complete, and withal

more natural, might be found in many a thinly peopled country parish. The lover of the beautiful might take possession of a shed or barn, and days would go by without anyone intruding on him. If I wanted to pass three or four hours perfectly undisturbed I should go by train to the nearest country village, and then walk along any quiet lane for a mile or two, and by that time I should leave man and his belongings far behind. The sun might rise high in the heavens and sink again to rest, and had I laid my plans well for the day, not more than two or three persons would disturb me. There are parts of England, not many miles from the immense town where I originally commenced this article, which give not a bad idea of the solitude of the backwoods of America and the plains of Australia.

Thackeray has, in "*The Virginians*," beautifully described the change that has come over our country roads and lanes.

The high road of a hundred years ago was not that grass-grown desert of the present time; it was alive with constant travel and gaiety. The ponderous wagon, with its bells and plodding team; the light post coach, that achieved the journey from the White Hart, Salisbury, to the Swan with Two Necks, London, in two days; the strings of pack-horses that had not yet left the road; my lord's gilt post-chaise and six, with the outriders galloping on ahead; the country squire's great coach and heavy Flanders mares; the farmers trotting to market, or the parson jolting to the cathedral town on Dumpling, his wife behind on the pillion. All these brisk sights and brisk people greeted the young traveller on his summer journey. Hodge, the farmer's boy, and Polly, the milkmaid, bobbed a curtsey as the chaise whirled over the pleasant village green, and the white-headed children lifted their chubby faces and cheered. The church spires glistened with gold, the cottage gables glared in the sunshine, the great elms murmured in summer or cast purple shadows over the grass.

But I must reluctantly leave the delights of country rambles of which the visitor to Bournemouth may easily have his fill, and confine myself to the subject proper of this article.

One of the most momentous events in the history of Bournemouth was the cutting of the new line from Brockenhurst to the East station, a work involving vast engineering

difficulties, and costing three quarters of a million. For some years the obstacles to success threatened to overwhelm the contractors, and to tire out the patience of the residents in the town. At last the directors were rewarded for their energy and perseverance, and the official opening of the Direct Bournemouth Railway, March 5th, 1888, brought the Town fully into the world and placed it in touch with London ; this great event may be taken as a good text for an article on a rising watering place, which is growing in general favour, and competing keenly with older towns over which it has many advantages, the chief being its comparative newness. Some watering places, like Weymouth, were general favourites a couple of centuries ago ; built when no attention was paid to sanitary measures, and people were content with narrow streets, the older parts are crooked, unsavoury and unattractive. How different in all respects is Bournemouth, which has sprung up in the lifetime of people still comparatively young. Dr. Wake Smart, of Cranborne, who, however, has long left middle life behind, tells me that he distinctly remembers the town when it consisted of only half a dozen houses, and when no expectation of its future greatness was entertained. The main roads are straight, excellent and broad, the side streets wide and open, and there is altogether a picturesqueness rarely found in English towns. Moreover, the area covered is extensive, while the houses are solidly and handsomely built, with, usually, good gardens around them, so that the larger villas and more pretentious lodging houses stand in shrubberies and small fields.

The contrast presented by our modern health resorts and those of two centuries ago I have dwelt upon in many long articles. Bournemouth is a splendid instance of the new watering-place, far-reaching, bustling, and replete with every comfort and luxury. Given a fairly long purse, and it would be easy to maintain that no one could command greater profusion

in London itself. Bournemouth is practically a suburb of the metropolis ; true, Brighton is often called London-on-Sea, but the Hants watering-place is prettier, better laid out, and within easier reach of lovely country than its Sussex sister. We shall probably live to see it as large and populous as Brighton.

Between Tunbridge Wells in 1724 and Bournemouth in 1891 what an impassable gulf ! The advantage is all on the side of the latter. None of the histories of Tunbridge Wells give any idea of the pursuits and amusements in that famous watering-place when George I. was King, although in a volume of "Familiar Letters," published by Samuel Briscoe in 1724, the following description occurs of the town by Mr. Ward, author of "The London Spy." Let the visitor compare the Tunbridge Wells of that day with the Bournemouth of ours.

The chiefest pastimes, next the old trade of basket-making, are the four following :—Bowling at Rusthall Green, where fools lose their money and knaves win it ; dancing upon Southborough Green ; walking in the grove where ringdoves coo above, whilst lovers bill below and project all things in order to make themselves happy at the next merry meeting ; and gaming at the Groom Porters, where everyone strives to win, and the box runs away with the money. Lodgings are so dear and scarce that a beau is sometimes glad of a barn, and a lady of honour content to lie in a garret, the horses commonly being put to grass for the servants to lie in the stable. My landlord was a farmer, and his very outhouses were so full that, having sheared some sheep, he abated me half a crown a week to let the wool lie in my chamber. The most noble of their provisions is a pack saddle of mutton and a wheatear pie, which is accounted here a feast for a Heliogabalus, and is indeed so costly a banquet that a man may go over to Amsterdam, treat half a dozen friends to a fish dinner, and bring them back again into their own country almost as cheap as you can give yourself a true Tunbridge Wells entertainment. The liquors chiefly produced by this part of the country are beer, made of wood-dried malt, and wine drawn out of a birch tree ; the first is infected with a smoky tang, that you would think was brewed in a chimney, and every pint you drink, instead of quenching your drought, begets a thirst after a gallon ; the latter, as 'tis ordered, drinks almost like mead, and makes a man's mouth smell of honey.

The difference between the gaiety of Tunbridge Wells in summer, and its dulness out of

season, was well shown by the common saying : "Where are you going ?" "To Tunbridge Wells. Where did you think ? Change me a guinea." Contrasted with the reply : "To Tunbridge Wells ? good lack ! Give *me* change for a shilling."

Guide books abound, and perhaps the most complete is the "Medical Aspects of Bournemouth," by Dr. Horace Dobell, a brother of the late Sidney Dobell, the poet, and one of the many medical men who have flocked into the town. He and I had some lively passages at arms, but although I don't think that I had the worst of the encounter, he showed good nature, and earned my respect. Dr. Dobell claims for Bournemouth the proud pre-eminence of having a perfect and genial climate. Does he not go somewhat too far ? And yet Bournemouth has conspicuous advantages of climate and position ; and fewer people would come away disappointed were some of the descriptions that are published more in accordance with actual fact. But when people are assured that at Bournemouth they will find a perfect climate, and that even on the coldest days the sun shines warmly, they cannot help being disappointed. Dr. Dobell actually talks of "the only very bad week of the whole year," as though in most winters good weather could be counted upon with as much certainty as daylight. Nowhere in the United Kingdom is the winter warm, agreeable, and dry ; nowhere can invalids sit out day after day. Wide differences there are, certainly, and the southern and south-western districts have less cause of complaint than those farther north and east. But whatever horrors fill our winters even at Bournemouth, our summer is wholly different ; it is delightfully free from the annoyances and insect pests of hot regions. If I might express one wish regarding it, it would be that it brought more fine, cloudless days ; I do not ask for a higher temperature, though that would be grateful ; I do not sigh for a longer summer, though it is disappointing

to have so few fine days before June, and not to be able to count on them after about the 20th of August. But I wish that during the ten or twelve weeks when the days are long, the flowers in their glory, and the fields green, there were fewer clouds. In short, I wish that the life-giving merry sun would not so often hide himself behind dense clouds, and leave the earth to mourn his absence.

For a British health resort Bournemouth is greatly favoured, and it has many attractions for people who cannot winter abroad ; but with the rapid cheapening of Continental travel, even our most fortunate health resorts feel foreign competition keenly. Continental health resorts have drier, warmer, and brighter winters—all the letters in the world to the papers notwithstanding—but the high price of fuel is a terrible burden on all except the very rich, especially in spells of severe weather. The well-to-do Englishman accustoms himself to heated rooms—often at over 70° F.—and feels bitterly cold when the thermometer marks only 56° or 58° ; indeed, visitors from the coal districts of the north of England, where coal can be got at 10s. a ton, and accustomed to pass their lives indoors in an overheated atmosphere, are often great in their denunciations on cold rooms, and are never tired of repeating that they never felt the cold at Sheffield or Newcastle as they do at Bournemouth or Ventnor, where coal costs 25s. to 30s. a ton, and smaller fires are the rule. An advantage that Bournemouth has over foreign places is that it is *home*, and this must count heavily in the balance in its favour.

I shall now lay before the reader some valuable tables of temperature and other climatological observations ; from these he will see the exact position of the town and neighbourhood. They convey volumes, and are worth all the rhapsodies and poetical descriptions with which some interested writers have tried to delude the public.

TABLE I.  
COMPILED BY MR. MARRIOTT.

	Absolute.		Mean Temp.	Annual Range.	Cloud.	Rainy Days.	Inches of Rain.	Relative Humidity.
	Max.	Min.						
<b>1885.</b>								
Alston ...	80.4	51	43.4	75.5	7.3	225	42.26	87
Cheadle ...	82.8	21.0	45.6	61.8	6.7	201	30.25	87
Southbourne ...	82.7	21.3	48.8	61.4	5.9	164	27.26	81
Torquay ...	86.3	24.8	49.6	61.5	6.4	176	32.05	78
Guernsey ...	82.8	29.1	51.4	53.7	7.0	169	30.42	83
<b>1886.</b>								
Alston ...	77.7	2.0	42.5	75.7	6.9	229	63.2	83
Cheadle ...	78.8	18.2	45.9	70.6	7.1	213	36.41	87
Southbourne ...	85.2	21.4	49.0	63.8	6.0	181	33.59	82
Torquay ...	82.3	24.3	49.6	58.0	5.9	193	37.75	—
Guernsey ...	78.1	29.2	51.5	58.9	6.7	198	40.25	86

TABLE II.  
FROM MR. GLAISHER'S TABLES FOR 1886.

	Absolute.			Mean.				
	Max.	Min.	Range.	Max.	Min.	Temp.	Cloud.	Rainy Days.
Southbourne, 1st Quarter ...	57.5	21.5	36.0	42.7	32.6	37.6	6.1	50
Wolverhampton, 1st Quarter ...	60.1	13.4	46.7	39.9	28.8	34.3	8.0	48
Southbourne, 2nd Quarter ...	75.2	30.0	45.2	58.7	44.6	51.0	5.3	39
Wolverhampton, 2nd Quarter ...	73.9	27.0	46.9	58.5	40.7	48.0	7.8	43
Southbourne, 3rd Quarter ...	85.2	37.9	47.3	67.6	52.9	59.6	4.6	30
Wolverhampton, 3rd Quarter ...	81.8	34.4	47.4	66.3	49.0	56.5	6.6	35
Southbourne, 4th Quarter ...	69.9	23.1	46.5	51.9	40.6	46.2	5.6	62
Wolverhampton, 4th Quarter ...	70.6	19.4	51.2	48.0	36.7	42.1	7.5	53

TABLE III.  
COMPILED BY MR. WILLIAM MARRIOTT.

## HOURS OF SUNLIGHT.

	1885.	1886.
London .....	1018	1003
Southbourne .....	1523	1538
Buxton .....	983	679
Ventnor .....	1704	1683
Blackpool .....	1326	1239

From the last edition of Dr. Dobell's work, I take the following figures; there is not an exact correspondence between them and those quoted above; they give Bournemouth a somewhat warmer, drier, and brighter climate, but the difference is not very great.

Mean daily monthly maxima for eighteen years:—

Jan.	Feb.	Mar.	April	May	June
44.5	46.7	49.0	54.6	59.6	65.1
July	Aug.	Sept.	Oct.	Nov.	Dec.
68.8	68.8	64.3	56.6	49.5	50.0

Mean daily minima of each month for the same time:—

Jan.	Feb.	Mar.	April	May	June
35.8	38.0	37.1	40.9	44.4	50.4
July	Aug.	Sept.	Oct.	Nov.	Dec.
54.2	54.3	50.8	45.0	39.0	36.1

Mean daily monthly range:—

Jan.	Feb.	Mar.	April	May	June
8.7	8.7	11.9	13.7	15.2	14.7
July	Aug.	Sept.	Oct.	Nov.	Dec.
14.6	14.5	13.6	11.6	10.5	8.9

Adapted mean monthly temperature:—

Jan.	Feb.	Mar.	April	May	June
40.2	40.2	42.5	46.8	51.1	56.7
July	Aug.	Sept.	Oct.	Nov.	Dec.
60.3	60.7	57.0	50.4	44.1	40.8

The mean temperature of the year, according to Mr. Glaisher's method, is 49.4. The maximum temperature was above 80° in eight years, and below 80° in ten; while in eighteen

a maximum of  $82^{\circ}$  was only twice exceeded—in 1868 and 1876.

Mean monthly amount of cloud, perfect clearness being represented by 0, and a completely overcast sky by 10.

Jan.	Feb.	Mar.	April	May	June
6.1	...	6.1	...	4.6	...
6.1	...	4.6	...	4.4	...
July	Aug.	Sept.	Oct.	Nov.	Dec.
4.2	...	4.1	...	4.1	...
4.2	...	4.1	...	4.9	...
4.2	...	4.1	...	5.8	...

Mean monthly humidity, or relative humidity (saturation being represented by 100):—

Jan.	Feb.	Mar.	April	May	June
86	...	88	...	81	...
86	...	88	...	78	...
July	Aug.	Sept.	Oct.	Nov.	Dec.
77	...	77	...	78	...
77	...	77	...	83	...
77	...	77	...	85	...
77	...	77	...	86	...

Mean monthly rainfall in inches:—

Jan.	Feb.	Mar.	April	May	June
3.20	...	2.50	...	1.80	...
3.20	...	2.50	...	1.80	...
July	Aug.	Sept.	Oct.	Nov.	Dec.
2.30	...	2.34	...	2.94	...
2.30	...	2.34	...	3.23	...
2.30	...	2.34	...	3.09	...
2.30	...	2.34	...	3.01	...

Average number of days on which rain fell:—

Jan.	Feb.	Mar.	April	May	June
17	...	16	...	12	...
17	...	16	...	12	...
July	Aug.	Sept.	Oct.	Nov.	Dec.
13	...	12	...	14	...
13	...	12	...	16	...
13	...	12	...	14	...
13	...	12	...	16	...

Average number of days on which the wind blew during the year from the following quarters:—

N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Clm.
39	...	50	...	26	...	28	...	26
39	...	50	...	26	...	28	...	26
39	...	50	...	26	...	70	...	68
39	...	50	...	26	...	70	...	68
39	...	50	...	26	...	70	...	68
39	...	50	...	26	...	70	...	68
39	...	50	...	26	...	70	...	68

Those tables have the high authority of Mr. Glaisher, F.R.S., and of Mr. William Marriott, the able and distinguished assistant-secretary of the Royal Meteorological Society. I am sorry for it, but they dispose, by the iron logic of inexorable figures, of innumerable papers and articles on the Sicilian beauty of the climate, and hardly bear out Dr. Horace Dobell's description of a Bournemouth winter. They show that Bournemouth has a climate three degrees warmer than Wolverhampton, with about the same range of temperature, and the same number of rainy days, but with not quite such a low absolute minimum. The one matter—but most important truly—in which Bournemouth excels the midland town is in the greatly larger amount of sunlight. It has twice as many hours of clear sunshine as Buxton,

Cheadle, and Wolverhampton, so that on many days, when it is not inviting to go out of doors in those places, open-air exercise is agreeable at Bournemouth, or, more accurately, endurable. But the climate is very far from perfect. I do not want to be captious, but few invalids from a distance go to Bournemouth, nor, indeed, to any other southern watering-place, without complaining, and justly too, that they have been deceived by exaggerated statements. They should remember that the climate of the United Kingdom is remarkable for its equability, that the ocean breezes pretty equally modify it in all districts, and that between the extreme south of England and the most northerly of the Scotch Islands the difference in the mean annual temperature is only six degrees. Contrary to the general impression, July in the south—over a small area between Bath, London, Oxford, and Salisbury to be exact—is  $11^{\circ}$  Fahr. higher than July in Unst, while the difference in the January temperature between the two is scarcely appreciable. From the beginning of November to the end of March longitude, not latitude, is the most important factor. Still the winter of the south and west, though so little warmer, is far brighter and pleasanter, and that is a distinct gain.

### SCAVENGING, TOWN REFUSE, AND SEWAGE.\*

By CHARLES JONES, A.M.Inst.C.E., Past President of the Association of Municipal and Sanitary Engineers, and Surveyor to the Local Board, Ealing.

*(Concluded from page 154.)*

Two days after a letter, with my own signature attached, followed, calling attention to the fact that we need not go so far back as thirty years, nor to a place so far removed as Bombay. The mode suggested by the correspondent had been in operation in the district in which I reside for some eight years past, and the point I desired

\* A Lecture delivered at the Sanitary Institute.

to raise, gentlemen, is not a new one. I have spoken upon it and referred to it for some years past, and I called the attention of the Metropolitan Board to the matter, but without effect. Although they did carry out some experiments, they were carried out in such a way that it was impossible for them to succeed, so little did their officials know about it. At the discussion at the Institute to which I have already referred, Mr. Dibden said: "Mr. Jones did not contend that he could burn the unpressed sludge, but only the pressed, and based upon that an enormous annual outlay for the purpose of pressing. But the real fact of it is, gentlemen, I have never pressed a ton of sludge since my destructor has been in work, but it is mixed with house refuse, goes into the furnace in almost a semi-liquid state, and is delivered as a hard and valuable clinker. Mr. Dibden stated that before the pressed sludge can be burned the water must come out by heat, but he concluded with these significant words, that if dust-bin refuse of a town is available, doubtless the object can be attained by the use of destructors." In these few words I maintain that you have the solution to the difficulty. Why should not the Metropolitan Board of Works have had the refuse of the dust-bin? The various authorities along the banks of the Thames would have been only too glad to have had a depot, and barge it down to the northern or southern outfall. We all know the trouble that for years and years has gathered round this question, when a remedy so readily might have been found. I have been told that the quantities are so large, and the amount of sewage is so great; but it seems strange in these days of the Forth Bridge to hear words of this class. The whole treatment of the London sewage at two outfalls would be a mere bagatelle, if those with whom the matter rests would face the difficulty. I have stated that in England at the present time there are some two hundred cells at work employing less than

a hundred men, and dealing with something like 500,000 tons of refuse. How much room do you think these 200 cells would take supposing they had been built at Barking, where I believe there are some 70 acres of land available? You will be surprised to hear that they can be put upon an acre of land, with plenty of room to work between them, and that the cost of erecting them would not amount to more than three hundred or three hundred and fifty pounds per cell. Supposing the 200 cells had been built, and the question tried, there would have been, according to the data which we have, and which there is no disputing, as it is in daily work, 1,000 horse-power at hand, or, in other words, the coal bill would have been saved. No nuisance would have been created by the adoption of the process, which, after all that has been said with respect to other systems, has held its ground, and will do so. I refer to the milk of lime process, which will ultimately come about. I know that it may be replied that the effluent that is turned out by this process is not pure. No one in the present day would say that it was, but the question is, is it not pure enough to be discharged into the Thames at Barking and Crossness? I have been sending, to the satisfaction of the Thames Conservators, from 750,000 to a million gallons of effluent per day for many years into the Thames, and many visitors have made the remark, and not a few of them members of the Metropolitan Board of Works, why cannot we do the same? and I say unhesitatingly that under the lime process and the destruction of refuse, as suggested by me, the river would assume a character in every way satisfactory, and at a mere bagatelle of cost when compared with the expensive schemes already referred to. Other points might be raised in connection with this effluent water—for instance, that of aeration. And here I may add that sufficient steam would be produced from the refuse, over and above the quantity required for ordinary pumping purposes, which might be brought to bear upon the effluent

in aeration, and which, to my knowledge, can be productive of immensely beneficial results. For one moment we will refer to the "Silver Thames," the Thames which enthusiasts would see a clear, pellucid stream.

Sir R. Rawlinson says: "Look at this mighty city of London, with its millions of inhabitants; look at the beautiful river, which flows gently down in silver sheen from its upper reaches, and supplies wholesome water for the swarming population inhabiting its banks; look again at its lower reaches, the great highway to all the nations of the earth, whose ships, laden with the produce of all climes, crowd the wharves and docks, and then say if the final result of the main drainage question shall be to leave the grand old river a black, loathsome, stinking ditch. My final conclusion is that the sewage must be disposed of out of the river Thames."

Should the fulfilment of the "silver stream" desire ever be brought about, the time will have come when those who may be wandering about its deserted banks may look expectantly for Macaulay's New Zealander. Do you know what the population of the Thames is? I have heard it stated that it is something like 300,000, and that on its bosom, and in and out of its docks, there pass every day some 50,000 human beings. This is the population of a large town, and we hope it may long continue so, but can you estimate the effect of a population such as this, and yet speak of the Thames as a silvery stream? Only recently I received a message from a gentleman farmer largely interested in the milk trade. It arose as follows, and was a reply to a question of mine which materially affects the view taken by irrigationists. A short time since a letter appeared in which the writer referred to the condition almost of famine which London was in with respect to milk, and pleading for irrigation upon the marshes as a means of meeting this difficulty. No more fictitious theory can be put forward than this, and none more damaging than the view taken as to the necessity for

flooding the marshes with London sewage. My informant says milk is supplied in London at the present time at such a price that it leaves a mere fraction of profit to the farmer, and the reply is, as I understand it, that if the milk supply of London was doubled the trade would be absolutely valueless. During the summer months it is supplied at 1s. 3d. per barn gallon (8 quarts), and 1s. 8d. during the remainder of the year. What then becomes of the question of the value of land upon which so much has been spent? I must leave it to the common sense of perhaps those who are not agriculturists or irrigationists to answer. At the present time there are probably two million tons of house refuse collected in London. Half of that can be barged to the outfalls, and the remainder can be utilised in the districts to which it appertains. You would then have steam power enough to create electric energy over a good part of London, besides dealing with the vexed question of sewage sludge. Are these points not worth considering? Is it no matter of moment—and the difference between it is as fifteen millions to half a million? Surely it may well be taken into consideration by those who are willing to take an unbiased view of the matter, and see that the question is handled so that it will bring about a result somewhat different to that which has lately been before the public, and which I sincerely hope—much as I esteem the gentlemen whose names are attached either to the one scheme or the other—there may be many a long day before they are carried into execution.

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#### HAY FEVER, HAY ASTHMA, OR SUMMER CATARRH.

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By W. ABBOTTS, M.D.,

Formerly Physician to the North London Hospital for Diseases of the Chest, &c.

ALTHOUGH at this period of the year the great majority of people are enjoying the warm, bright days, we have amongst us a

relatively small minority—yet numbering thousands—to whom summer means an annually recurring attack of illness, accompanied by much discomfort, and frequently partially or totally incapacitating the unfortunate victims for their usual avocations during weeks and months. We refer to those persons who suffer from the affection now generally designated as Hay Fever.

This disorder, to which the different names placed at the head of this article have been variously applied, according to the relative intensity of the febrile, bronchial, and catarrhal symptoms, is one of great special interest.

In some patients the febrile, in others the bronchial or pulmonary, and in others the catarrhal symptoms predominate; while in many, again, the several groups of symptoms are blended, or alternate with each other. The catarrhal, and next to them the febrile symptoms are most common in persons under thirty-five years of age: after this period of life, the asthmatic symptoms are frequently most prominent.

Although it is an affection in which the symptoms are often most unmistakable, and the patient's sufferings very severe, scarcely any references to it are to be found in any of the older works on medicine. The first mention seems to be in Heberden's Commentaries on the History and Cure of Diseases, a posthumous work edited by his son, in 1802. This author, writing on the subject of catarrh, observes, "I have known it (catarrh) to return, in four or five persons, annually in the months of April, May, June, and July, and last a month, with great violence."

The next we learn of Hay Fever is in an article by Dr. Bostock, published in the Medico-Chirurgical Transactions for 1828. Dr. Bostock was himself a sufferer from the "great violence" of Hay Fever, or, as he styled it, summer catarrh—*catarrhus aestivus*—and this circumstance prompted him to make such researches and inquiries as served to throw much light upon the affection.

Still the subject did not receive the attention it deserved until the publication, in 1862, of an interesting monograph, entitled *Der Typische Frühsummer-Katarrh, oder das sogenannte Heu-Fieber, Heu-Asthma* (on the typical catarrh of early summer, or the so-called Hay Fever, or Hay Asthma). This work was from the pen of my esteemed friend, Dr. Phœbus (a somewhat appropriate name, when we consider the important part often played by the sun's rays in inducing Hay Fever), Professor of Medicine in the University of Giessen.

When I brought out the first edition of my book on this subject (bearing the same title as this article), nearly thirty years ago, it was the first in the English language. Since then various works have been published, most of them copying mine to such an extent that, while admitting that "imitation is the sincerest form of flattery," I have felt it decidedly unfair; indeed, in one instance, I had to resort to legal proceedings for infringement of copyright, and won the day.

As the affection is attributable to numerous other uses besides the aroma of hay, it will be noticed that Professor Phœbus preferred to style it "*Frühsummer-Katarrh*," which may be abbreviated to summer catarrh, thus corresponding with Bostock's term. Still, for ordinary descriptive purposes, and having regard to the circumstance that the disorder is most prevalent during the hay season, the term Hay Fever will be principally employed in this article.

The symptoms of Hay Fever are of varied character. Phœbus arranges them in six groups; and, as his classification is a sound one, I shall follow it here. Of course, they seldom occur in the same exact, regular manner as is described, occasionally some symptoms, at other times others, prevailing.

The first group of symptoms are connected with the nostrils, and are similar to those of a severe catarrh, especially sneezing, which is very loud and frequent, and recurs in paroxysms of

ten, twenty, or more sneezings in rapid succession, coming on at short intervals ; so that the sufferer may sneeze as often as several hundred times in the course of twenty-four hours. One patient, a medical man, thirty-four years old, in whom the first attack of Hay Fever made its appearance as early as the eighth year of his age, when describing his own case, specially referred to the sneezing and the struggle against it, as constituting a continuous and very troublesome annoyance. When he passed the day without much sneezing, he usually enjoyed almost entire freedom from asthma during the night ; on the contrary, when the sneezing had been more marked during the daytime, the patient was generally tormented by asthmatic paroxysms at night. The excitation caused by the sneezing appeared to render the bronchi peculiarly irritable, and liable to spasm ; a complication which I have observed in several cases. At the commencement of the attack there is no discharge, or only a slight one, of nasal mucus, but after a few days a considerable quantity of watery, limpid fluid is discharged from the nostrils. The nose often becomes swollen and inflamed, but the sense of smell, although occasionally diminished, is seldom completely lost. In some cases, indeed, the faculty of smell may become so acute as to make it impossible for the sufferer to remain in a room where strongly scented flowers have been placed.

The second group of symptoms are observed in the eyes, and the patient complains of catarrhal ophthalmia, with greatly increased secretion of tears. Heat and a sensation of fulness are felt, at first along the edges of the lids, particularly at the inner angles, and after a time these symptoms extend over the whole of the eyeball. Acute itching and irritation are subsequently experienced. The flow of tears is often excessive ; the conjunctival lining of the eyelids looks red and swollen, especially at the margins, and a thick, yellowish matter is secreted by them. The eyesight is weakened, and the intolerance of light is often very trying.

The third group of symptoms are localised in the throat, and are somewhat similar to those present in catarrhal sore throat. There are redness and inflammation of the mucous membrane, with intense itching of the fauces and the posterior part of the soft palate, and this unpleasant sensation is aggravated by the ineffectual efforts which the sufferer makes to relieve it by moving the tongue about the mouth. Sometimes an eruption of a number of minute inflamed points makes its appearance at the back of the mouth. There is difficulty, sometimes even pain, in swallowing ; the mucous secretion is at first diminished, but is afterwards increased, and becomes very abundant. The tonsils and uvula are redder than usual, and relaxed.

The fourth group of symptoms are those connected with the head ; the most prominent of these is headache, sometimes only slight, but more commonly severe, and situated either at the forehead, which feels hot and burning, at the back part of the head, or throughout its entire extent. The pain is very often brought on and increased by the paroxysms of sneezing, and, assuming a neuralgic character, it may extend along the course of the facial nerve, or into the external auditory passage. The patient complains of a constant feeling of irritation and itching about the forehead, the nose, the chin and the ears. Sometimes, he also suffers from giddiness, loud ringing or buzzing noises in the ears, and other signs of congestion of the brain, especially if the paroxysms of sneezing have been very great.

The fifth group of symptoms are situated in the whole extent of the mucous membrane of the larynx, extending also to the bronchi, and the patient is affected with bronchial catarrh, asthma, and cough, with a variable amount of difficulty of breathing. In some instances the cough is comparatively insignificant, while in others it is very severe and loud, and may then be accompanied by expectoration, which is occasionally copious, and in rare cases streaked

with blood. Not unfrequently a sensation of irritation is felt in the larynx, or the trachea, and there is a feeling of weight and oppression within the chest; the patient's voice becomes muffled and hoarse, and in some instances I have observed almost complete loss of voice. The difficulty of breathing is sometimes very distressing, and wheezing, sibilant sounds may then be heard throughout the greater part of the lungs. These attacks of dyspnoea are more strongly marked towards the evening, and continue during the whole of the night. It is in this class of cases that the patient's sufferings are the most severe. Generally, after having been asleep for one or two hours, or a longer period, the patient wakes up suddenly, gasping and struggling for breath, as if every moment would be his last; his eyes are protruded, his lips and face become livid, and he eagerly throws open the windows and door of his room in his ineffectual efforts to get more air, until he finally sinks down completely exhausted. When he falls asleep again, his slumber is short and restless, and he is once more aroused, after a brief interval of repose, by the same painful constriction across the chest, and the difficulty of breathing. The regular periodicity of the asthmatic attacks in relation to the hours of sleep is remarkable.

The sixth group, in which are comprised the general symptoms, are those of catarrhal fever, together with disturbance of the nervous system. The pulse is not greatly increased in frequency during the day, but towards evening it becomes much accelerated, and the number of beats may amount to as many as one hundred or more in the course of a minute. Shivering and cold perspirations come on alternately after the more severe attacks of coughing and sneezing. The patient is uncomfortable, restless, and unfit to attend to his ordinary avocation, and complains of weariness, defective memory, inability to fix his attention upon what he is doing, and heightened susceptibility to external impressions. There is a sense of general irri-

tability, and the least noise, draughts of cold air, and various trifling inconveniences, which at other times would pass unheeded, disturb and distress the sufferer very much. The digestive organs are often greatly impaired, as is evident from the loss of appetite, furred tongue, acid dyspepsia, and other corresponding conditions. The skin is hot and dry before the paroxysms come on, and, after they have passed off, it becomes clammy, moist, and sometimes bedewed with copious perspiration. Herpes and urticaria are two forms of skin disease which not unfrequently make their appearance during the progress of the affection.

The premonitory symptoms are not of long duration, and they consist chiefly of a general feeling of ill-health and *malaise*, together with various uncomfortable sensations in the different organs where the affection subsequently becomes localised. The permanent symptoms usually come on suddenly, and remain for some weeks or even, in severe cases, months. The parts which are first affected are the eyes, and the nose: next, the throat complications set in; and, as a general rule, the bronchial symptoms occur still later. The symptoms connected with the nose and eyes are commonly most severe in the morning, commencing directly the patient rises from bed; the difficulty of breathing and the feverishness are more marked towards night. As the attack wears off, the local symptoms are diminished, and gradually disappear, leaving behind general debility, with heightened sensitiveness of both mind and body. The patient is for some time liable to a relapse, if he should happen to be again exposed to the exciting causes of the malady. Many patients suffer from a second attack, usually not so severe as the first, in the months of August and September.

The duration of the illness varies in different persons. The average length of the prominent symptoms is from four to eight weeks; but in some individuals it lasts for as long as three or four months.

During the earlier years in which a patient is subject to the attacks of Hay Fever, the length of the illness increases with every year: but at a later period of life it may gradually diminish. The tendency to suffer from the affection is never completely lost in those who are predisposed to it; in evidence of which fact I may mention that I once had under my care a gentleman, eighty-three years of age, who had suffered from Hay Fever for more than fifty years. During the greater part of June, July, and August, he had been more or less invalided; representing in the aggregate a large amount of suffering and disablement through this single ailment, in addition to which, when he first came under my notice, asthmatic complications existed at other seasons of the year.

Hay Fever is most commonly a disease of adult life, but it may occur at all ages, and even in very young children. It makes its first appearance usually between the tenth and thirtieth year of life, and very rarely, indeed, has it been known to fail to show itself until after forty years of age.

It is singular how many individuals suffer from Hay Fever for years, without the real nature of the affection being suspected. One person imagines that he is suffering from an attack of common influenza; another thinks that he is merely out of sorts; and a third fancies that his ailment is ordinary asthma or bronchitis; so that they may go on for many years without divining the cause, or deriving benefit from treatment.

One peculiar characteristic of Hay Fever is its periodical return, which happens almost invariably about the month of June in every succeeding year,—the date of its recurrence bearing a direct relation to the first hot days of summer. The sultry, close weather at the commencement of summer is always a powerfully exciting cause of Hay Fever.

Another point worthy of remark, is the hereditary tendency to suffer from this disease. In connection with the family history of

patients having Hay Fever, it is interesting to note the close relation which evidently exists between this disorder and asthma, bronchitis, gout, and intermittent fever. In seventy per cent. of cases, either the parents or other very near blood-relatives have suffered from one or other of these four affections. The connection of intermittent fever, or ague, with Hay Fever, is the more remarkable when we consider the periodicity shown in these disorders.

Hay Fever has been more frequently observed in England than in any other country; but the apparent greater prevalence here may be due to the greater attention which has, of late years, been given to the subject. According to different Continental authorities it is evident that the disorder is not uncommon in Germany, Belgium, France, and Switzerland; and cases have also been recorded of Hay Fever occurring in Italy, Austria, Russia, Denmark, and other European countries. A patient of mine told me that he suffered severely from Hay Fever every summer, during ten years' residence in New Zealand, where, he said, the affection is common. I have also met with persons who have suffered in Australia and India, and at the Cape.

It is known to attack many persons in America; and Dr. Dunglison, of Philadelphia, in his "Practice of Medicine," bears testimony to the fact that "summer-bronchitis," as he styles it, is as prevalent in the United States as it is in Europe. I have myself seen several sufferers there from Hay Fever, as well as from an analogous affection, attributed to the odour of roses when in bloom. The last-named affection is by no means rare in some parts of the United States where rose trees are cultivated in large numbers. It has been observed in England; and the majority of persons liable to summer catarrh find it impossible to remain for any length of time in heated rooms where numerous flowers are placed, as at a dinner party, or in rooms opening into conservatories containing flowering plants. It is an acknowledged fact

that the sense of smell, like the other faculties, is liable, under certain conditions, to undergo great intensification. Numerous well-authenticated cases have been recorded of persons, evidently in the enjoyment of good health, who have been suddenly and almost inexplicably affected by the smell of some particular flower. Some individuals cannot bear the scent of certain flowers, such as, for instance, roses and geraniums; and an anecdote is told of a distinguished French general, who, although he had gone through many campaigns with great bravery, always turned pale and even fainted at the odour of roses, if suddenly held just before him.

Hay Fever is more frequently observed in rural districts than in towns, and in the suburbs than in the central parts of large cities; and it is also more common in localities where grass is chiefly grown than those in which wheat crops are principally cultivated.

The exciting causes of Hay Fever include the following:—

The flowering of grasses, rye, etc. The species of grasses which are considered to be most productive of Hay Fever are the *Anthoxanthum odoratum* (sweet-scented vernal grass), the *Holcus odoratus* (sweet-scented soft grass), and the *Lolium perenne* (rye grass). The *Anthoxanthum odoratum* commences to bloom at the end of May, or in the earlier part of June, according to the state of the weather; and it continues to flower in the succeeding months of July and August. In connection with this point it is interesting to remark that the peculiar aroma of the grass, at the flowering period, is mainly due to the two first-named species of the *Graminaceæ*. Some years ago, M. Vogel ascertained that benzoic acid exists in both of these grasses, and that their odour is chiefly owing to this circumstance. Now, it is also remarkable that, in chemical factories, the inhalation of the vapour which escapes during the process of sublimation of benzoin causes considerable

irritation of the throat, and violent paroxysms of sneezing and coughing. The question suggests itself here whether Hay Fever may not, in certain cases, be attributed to the irritating effects of the benzoic acid which is liberated from the *Anthoxanthum* and *Holcus* by the agency of the summer heat; seeing that the attacks of Hay Fever are invariably worse during hot, dry weather, while they assume a milder character when the temperature is reduced, or the weather is wet, at which periods the amount of sublimation of the benzoic acid contained in the flowering grass would be less.

The exacerbation of the affection in very warm weather also points to local vascular congestion of the naso-pulmonary mucous membrane as one of the exciting causes of Hay Fever.

Other odours, besides those of grass and hay, have been known to bring on the affection in persons predisposed to it. That of roses, as already mentioned, beans in bloom, nettles, lilac, and elder-flower; while in India a similar complaint occurs among Europeans, in the months of February and March, when the mango and neem (*Melia*) are in blossom. Heat and dust combined will bring it on, as many sufferers could testify after making a long journey by rail, or on a dusty road, in hot weather.

The agency of increased temperature may be variously explained. The heat having a tendency to lower the tone of the sympathetic and general nervous system, the patient is weakened and made more susceptible to exciting causes; the various functions become disturbed from the same reason; while the heat sets free the odoriferous particles from the grass and flowers, and increases the quantity of dust and other irritant matters floating in the atmosphere.

Various other causes have been suggested, and their agency proved in certain instances, but as this article has already exceeded ordinary limits, I must pass on to some practical matters connected with treatment.

In treating this affection, as in the management of other affections, it is worse than useless to attempt to find a specific remedy for all cases, or to treat all by the same medicines; and the only rational method of relief or cure is by meeting the different symptoms as they arise. The treatment may be divided into two parts, viz.—the prophylactic, having for its object the prevention of the disorder, and the curative, to be adopted when the affection has shown itself.

The former will consist chiefly in the avoidance of the exciting causes of the disorder, such as the aroma of ripe grass or newly-made hay, and of strong-smelling flowers; protection from the heat of the sun, especially about mid-day; only a moderate amount of out-door exercise, which should be taken either early in the day or in the evening; unstimulating diet; attention to the functions of the skin, &c. Removal to the seaside is not unfrequently beneficial, but cannot always be relied upon; the cases in which a visit to the seaside will most likely prove advantageous are those in which the febrile or asthmatic symptoms prevail. It is commonly supposed that a removal to the coast is sufficient to produce a cure; but many persons find themselves disappointed in this respect—a matter not to be surprised at, when the heat, glare, and dust of many marine resorts are taken into consideration.

When the affection has actually seized upon the patient, we must direct our attention to the different symptoms as they arise.

Warm fomentations, either with water, or decoction of poppies, or marsh-mallow, should be used to relieve the swelling, pain, and irritation of the conjunctive and eyelids.

Glycerine, zinc ointment, or a solution of cocaine (that made from the tabloids, specially prepared by Burroughes, Wellcome and Co., being the most reliable), should be applied occasionally to the carunculae, or to the interior of the nostril by means of a camel's hair brush or a feather. A medical gentleman

who consulted me last year informed me that he had experienced considerable relief from painting the inside of the nostril with a solution of nitrate of silver; but, as a rule, emollient or sedative applications are the best. Various remedial substances can be combined with the glycerine, according to the requirements of individual cases; its solvent power being remarkably great, while it has the advantage over water as a vehicle for other substances, that it adheres better, and is consequently more readily absorbed, than water would be.

The frequent inhalation of the steam of hot water (either simple or medicated), and of different sedatives in solution in the form of atomized fluid, or spray, is valuable in relieving the unpleasant tickling sensation felt in the mucous membrane of the nose and other air passages. For the administration of medicated spray an inhaler is requisite, of which apparatus there are numerous forms. The advantages presented by this mode of treatment, whether in Hay Fever, or in throat or chest affections, are:—That the steam inhaled has a soothing and beneficial effect; (2) that the deep, prolonged, and steady inspirations taken by the patient while inhaling promote complete expansion of the chest, and help to bring him into a habit of more thoroughly filling the lungs during each act of inspiration; and (3) that by introducing remedies in this way into the system we avoid the disturbance of the digestive functions which often occurs when medicines are taken into the stomach by delicate persons.

Small pieces of ice, dissolved at frequent intervals in the patient's mouth, often succeed more than anything else in obviating the heat, dryness, and tickling sensation experienced in the roof of the mouth, palate, and fauces.

Amongst the best remedies for internal administration are lobelia, in full doses of the tincture, the preparations of opium, and aconite, the last-named being a most useful medicine if given in suitable cases, principally

the catarrho-febrile. The tincture is the best preparation, but great care must be exercised in its administration. A most convenient means of administering aconite, is the Tabloid Triturate of the tincture, prepared by Burroughes, Wellcome & Co., Snow Hill Buildings, London. Each tabloid, or disk, contains one minim of the tincture. Another very valuable remedy for reducing the febrile symptoms in Hay Fever is Antipyrin (also prepared by Burroughes and Co.) compressed into tabloids, each containing five grains.

Tobacco smoking sometimes effects wonders, as in ordinary asthma, in diminishing the severity of the paroxysms. The inhalation of the fumes produced by burning paper previously charged with a solution of nitrate of potash, also deserves notice, as being decidedly advantageous in some cases of an asthmatic character.

It would not be amiss here to give a word of caution concerning the useless and generally injurious nostrums—cigarettes, smelling salts, and similar absurd remedies, so eulogistically puffed by their proprietors in the newspapers, but absolutely destitute of remedial properties.

Bromide of potassium, or of ammonium, in full doses, proportioned to the age of the patient, and the intensity of the symptoms, given in some bitter infusion, will prove efficacious when the faucial or bronchial irritability is excessive.

The bitter vegetable tonics, particularly quinine, nux vomica, quassia, and gentian, or the preparations of iron, zinc, or arsenic, may be administered when the patient's constitution requires invigorating treatment.

The various functions should be regulated by appropriate medicines, and in all cases it will be judicious to prescribe an occasional cooling saline. At the same time, the very powerful and lowering depletives recommended by some writers must be carefully shunned, and it should be borne in mind that in a large majority of cases the patient's strength is reduced below its natural condition.

When the eyes are affected, soothing collyria (a lotion containing *liq. plumbi acetatis* being usually the best) should be frequently applied; and green or blue spectacles should be worn whenever the patient goes out of doors during the day-time. Reading by gas or any other artificial light must be avoided.

The diet should consist of nutritious, plain, easily digested food, with pale ale, sherry, or claret, or soda, potass, seltzer, or lithia water, plain or with whiskey or sherry, at lunch or dinner. Coffee, cocoa, or chocolate are the best fluids at other meals.

Moderate exercise ought to be taken in the open air daily in the morning or evening, in a shady, cool place, at as great a distance as possible from the exciting causes of the affection. The exercise should be either gentle walking, or riding in a vehicle, on roads free from dust. Riding on horseback is often prejudicial to recovery, and I have known many instances in which exercise on horseback either excited an attack of Hay Fever, or rendered the symptoms, previously present in a mild form, much more severe. In fact, any form of violent physical exertion, particularly where there is much heat or dust, should be guarded against.

Finally, it is a matter of no small importance that the clothing should be easy-fitting, light, and cool.

## THE INFLUENZA EPIDEMIC.

THE terrible ravages of this affection, following so soon upon the similar outbreak last year, its widespread distribution, and the mysterious and sudden manner in which influenza seizes upon its victims, have cast a gloom over the whole community. Indeed, although various epidemic visits of influenza have been recorded during the past century, we have to go back as far as 1782, upwards of a hundred years ago, to find a parallel to the present one. In that year not a single country in Europe escaped, and it

was estimated that more than 50 per cent. of the inhabitants of Europe suffered from influenza, while the fatality from the affection was very considerable.

The special number of HYGIENE on Influenza,\* published last year in pamphlet form, deals so fully with the subject, that it is unnecessary for us to traverse the whole ground again. We shall therefore limit ourselves in this article to a description of the symptoms, and a consideration of the best means to be adopted for the treatment of influenza.

The sufferer feels out of sorts, and chilly, even when near to a fire, and repeated shiverings occur; next, the eyes become tender, weak, and watery, and often persistent headache comes on, chiefly across the temples; sneezing (variable in degree) and copious running at the nose occur, followed by dryness and constriction of the throat, hoarseness, a dull heavy sensation within the chest, difficulty of breathing, and frequent troublesome cough. So far, these are principally the same symptoms as those of ordinary catarrh, but influenza further includes sudden debility, loss of muscular power, and depression of energy and spirits. The prostration is often intense and alarming in persons advanced in life, or of weakly constitution, and the majority of fatal cases are due to this condition, the sufferers not having sufficient vital strength to enable them to withstand the fury of the attack at its first onslaught, or the rapid development of pneumonia. A peculiarity of the present epidemic is that this inflammation of the lungs is frequently double, affecting both lungs simultaneously. Dull, aching pains are felt in the muscles and bones, more particularly of the back and legs. There is a tender, bruised sensation along the lines of the ribs, and in other parts of the body. Feverishness comes on apace, the surface of the skin becoming hot, dry, and roughened, with a

corresponding elevation of the general temperature. The tongue is white, the sense of taste is impaired, and the appetite fails; occasionally there is nausea. Sometimes the attack is ushered in by sudden faintness. The pulse is usually soft and weak.

When it is of a moderate, mild nature, the disease abates in violence after a few days, and the patient becomes convalescent within two or three weeks, although the debility continues for some time longer, making the sufferer unfit for his ordinary avocation, and rendering him susceptible to a second—in these instances generally more severe than the first—attack of the affection. The digestive functions often remain impaired for a long period after the other symptoms have disappeared.

What has been said here of the symptoms has reference mainly to average, mild cases, but too frequently the course of the disease is not of so benign a character. The fever is more marked, the temperature of the body being excessive, and the lung complications are serious of themselves, giving rise to grave apprehensions. Owing to the blood not being properly oxygenated in the lungs, as the result of their impaired condition, the heart (already enfeebled by the general debility) performs its office with difficulty, while the circulation of impure blood through the brain leads to disturbance of the mental faculties, amounting to partial delirium. The pains in the limbs do not pass off so soon in some cases as in others, and in such instances rheumatic complications of a distressing nature continue for a considerable period.

During the prevalence of the epidemic, directly anyone feels the symptoms we have described coming on, he should at once get home (if away from his residence), and have a hot body-bath, or foot-bath, if the prostration should not already have become too great to allow of the exertion, go to bed in a moderately warm room, with a sufficiency of bed-clothing, and endeavour to set up free action of the skin. With this object in view, he should take some

\* Influenza, its History, Nature, and Cure, price 6d., post free for 7 stamps. Beaumont and Co., 61, Charing Cross Road, London, W.

warm drink—hot wine and water, coffee, tea, or milk—apply a hot-water bottle to the soles of the feet, and hot flannels to the upper part of the back, between the shoulders. This treatment will generally produce copious perspiration. If not, the process should be repeated with a newly-filled bottle and fresh flannels. If chest symptoms should have begun to show themselves, a mustard plaster or a mustard leaf should be applied at the upper part of the chest, both in front and between the shoulder blades at the back, instead of using the hot flannels. A safe and efficient medicine, whether to cause perspiration or to relieve the cough, is as follows:—Spirit of nitrous ether, two drachms; syrup of balsam of tolu, six drachms; paregoric, four drachms; camphor water sufficient to make up to eight ounces; a sixth part to be taken at once, and this dose to be repeated every three, four, or five hours afterwards, according to the severity of the attack. This prescription is adapted to the case of a grown-up person; for younger persons down to the age of twelve years, only half of the dose named should be used, and under that age it would be best to substitute ipecacuanha wine, in doses of from five to twenty drops, according to the age of the little sufferer.

As our readers are well aware, we are not in the habit of prescribing in these columns, but having regard to the necessity of prompt action, and to the fact that in rural localities and isolated houses it is often difficult to readily obtain medical aid, we think that it will not be out of place to suggest suitable remedies, which can be procured from the nearest chemist, and administered pending the doctor's arrival. If, as is often the case, the patient should need an aperient (the action of the liver, &c., being checked), some simple medicine of that kind should be given, such as a dose of Epsom salts, a seidlitz powder, or syrup of senna, according to requirements and the patient's age. In all cases, but particularly when any troublesome complications manifest themselves, it will be

expedient to secure the personal advice of a medical practitioner.

The diet adopted during the first few days of an attack of influenza should be light, though nutritious, and, till the brunt of the fever is over, principally fluid—milk, gruel, beef-tea, and similar articles. Stimulants may be given in moderation, the best guide being the degree of prostration of the patient. A glass of wine, a little port or claret negus, or even whiskey, or brandy, diluted with warm water, will not unfrequently prove a valuable auxiliary in sustaining the patient's bodily strength and nerve-energy, and in inducing him to take some nourishment. If the fever should run high, the face be much flushed, and the skin assume a dusky red hue, stimulants should be altogether withheld, or resorted to with caution.

As regards auxiliary treatment, the inhalation of the steam of hot water, either plain or medicated with various remedial substances, will be found agreeable to the patient's feelings, and soothing to the throat and lungs. Antiperiodics, such as antipyrin (most conveniently administered in the form of tabloids, 5 grains each, specially prepared by Messrs. Burroughes and Wellcome, of Holborn Viaduct) or quinine.

As the patient progresses towards convalescence, he can begin to sit up after a few days, but care should still be exercised in maintaining an equable temperature of his room. He can also commence to take solid nourishment, and indeed, should live well. As soon as he can safely do so, he should get out into the open air and have moderate exercise, bearing in mind that for a considerable period he will be subject to a possible relapse.

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#### CADBURY'S COCOA ESSENCE.

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THE supreme value of cocoa as a pleasant and invigorating beverage is becoming more generally recognised, and the consumption both of cocoa and of chocolate is rapidly increasing, the

quantity used per head now amounting to something considerable. The dietetic value of cocoa has long been widely known, but the large quantity of fat present in it made the beverage too rich and heavy for ordinary stomachs, and this seriously checked its consumption. Of late years, by improved methods of manufacture, two-thirds of this rich and valuable, but not easily-digested, oil has been removed, and now it is rare to find anyone, however weak his stomach, who cannot relish and digest a couple of large cupfuls of cocoa or chocolate. We do not know any preparation of cocoa superior to that of Cadbury Brothers. It is absolutely pure and contains no sugar, starch, or other foreign ingredient, and its purity and aromatic flavour are its chief recommendations. But we regret to find that the English market is being systematically flooded with foreign medicated cocoa, that is, with brands to which considerable quantities of alkalies have been added by the makers in order to make a soup, as it were, with water. Pure cocoa is not soluble in water, it is merely suspended, and to overcome what some people regard as a drawback alkalies are being freely added. We are not sure that the foreign makers are altogether successful, and our own experiments have shown that, in spite of this free admixture of alkalies, the cocoa has still a decided tendency to be precipitated to the bottom of the cup, while in two or three days the cocoa soup or soap has a distinctly unpleasant smell. No medical practitioner could conscientiously countenance the use of cocoa containing a large percentage of soda, magnesia, and potash, at least by ordinary persons. We do not wish to include all foreign firms in this sweeping condemnation, for some could be named which are honourable exceptions, and are scrupulously careful to make and sell only pure, unmedicated cocoa. To Cadbury Brothers, however, is unquestionably due the credit of making nothing but absolutely pure preparations, so that their cocoa brands are the best for

invalids and for ordinary use, and their well-known Cocoa Essence stands absolutely alone in the market. Attention should again be drawn to the great value of chocolate, which is a manufactured article—for instance, of Cadbury's Mexican Chocolate—to excursionists and cyclists; a quarter-of-a-pound packet is sufficient to take the place of an ordinary meal, and furnishes the system with a large amount of digestible and palatable food. It can be taken while hurrying along on a cycle; there is no need to dismount, nor even to pause. As a delicious sweetmeat, too, the value of chocolate is becoming generally appreciated, so that, in one way or another, about twenty million pounds' weight are now used in the United Kingdom in the course of the year. This is, perhaps, not absolutely a very large amount per head, but vastly more than was used fourteen years ago, when it hardly reached half this quantity, and it is many times as much as was used in the childhood of people not yet very old. The increased popularity of cocoa is, in great measure, due to the improvements effected by Cadbury Brothers.

S. U. M.

## Notes and News.

DEATH FROM STARVATION is a thing which ought not to happen in the richest city of the world; yet a recent return shows that in twelve months this was the verdict returned by coroners' juries in various parts of the metropolis. But, of course, this return would fail to include the hundreds or, rather, thousands of deaths occurring annually in London as the indirect result of privation. Which is to blame? Our Poor Law system or the congested condition of the labour market, made worse by the immigration of immense numbers of destitute aliens from Eastern Europe?

HIGH-PRICED TEA seems to be the latest "wheeze." Two months back we recorded the sale of a small parcel of Ceylon tea at the previously unheard-of rate of £10 12s. 6d. per lb., but this has been capped by the sale of 5 lbs. of Ceylon tea, off another estate, at the unprecedented price of £17 per lb. A correspondent, writing to us on this subject, points out that these high prices are obtained only for tea coming from the plantations of companies, and suggests that other influences are at work besides the superior quality of the "golden" tipped leaves.

# HYGIENE,

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## EDITORIAL NOTE.

OWING to pressure on our columns—it being necessary to take a considerable space for the official programme of the Seventh International Congress of Hygiene, which promises to be as interesting as important—we are obliged to keep certain articles standing over until our next issue. Amongst these are Patent Medicines—No. 8, Mother Siegel's Syrup; Water for Towns, Constant *v.* Intermittent Supply; etc. With reference to the article on Patent Medicines, we should esteem it a favour if any of our readers would furnish us with information bearing on Mother Siegel's Syrup, or any other quack preparations.

## THE SEVENTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

LONDON, AUGUST 10-17, 1891.

### OFFICIAL PROGRAMME.

THE International Congress of Hygiene and Demography has been held previously in Brussels, Paris, Turin, Geneva, The Hague, and Vienna.

The permanent international committee appointed in Vienna resolved on the invitations of the Sanitary Institute and the Society of Medical Officers of Health that the seventh congress of the series should be held in London. It will be inaugurated on Monday, August 10th, by a General Meeting in St. James's Hall;

H.R.H. The Prince of Wales, the president of the Congress, will preside at the opening meeting. The meetings of the sections will be held on August 11th, 12th, 13th, and 14th, in the rooms of the Royal and other learned Societies at Burlington House, Piccadilly, at the University of London, in Burlington Gardens, and at the Royal School of Mines in Jermyn Street. Saturday, August 15th, will be devoted to excursions, and on Monday, August 17th, the closing meeting of the Congress will be held at the University of London.

The aim of the Congress is to stimulate public interest in the progress of Hygiene and Demography, by which latter term is understood the study of the life conditions of communities from statistical points of view; and to afford persons interested in these subjects an opportunity of meeting and of elucidating questions connected therewith by conference and debate.

The governments of all countries, municipalities, county councils, and other local administrations; public health authorities, universities, colleges, and all societies which are occupied in the study of the sciences more or less immediately connected with Hygiene, are invited to co-operate, and appoint delegates to represent them at the Congress. Up to the present date more than five hundred delegates have been appointed by different public bodies.

All delegates, and all persons who are interested in the work of the Congress, are eligible

to become members thereof. Intending members should forward their subscriptions, £1 each, to the Secretaries, 20, Hanover Square, W., at an early date, whereby they will greatly facilitate the work of the organising committee. In return, tickets entitling to admission for the whole week will be forwarded.

The work of the Congress is arranged in two divisions. Division I., Hygiene, comprises the following sections:—1. Preventive medicine; 2. Bacteriology; 3. Relation of the diseases of animals to those of man; 4. Hygiene of infancy and childhood; 5. Chemistry and physics in relation to Hygiene; 6. Architecture in relation to Hygiene; 7. Engineering in relation to Hygiene; 8. Naval and military Hygiene; 9. State Hygiene.

Division II., Demography, comprising demography, health statistics, and industrial hygiene.

Papers for the Congress must be in either English, French, or German. A copy should be forwarded not later than July 15th to the secretary of the section in which they are to be read. The time allowed for reading each paper is not to exceed a quarter of an hour, and speakers who take part in the discussions will be limited to ten minutes each.

**DIVISION I., SECTION 1.—*Preventive Medicine.***  
—After a short address from the president, Sir Joseph Farrer, M.D., F.R.S., a discussion will be held upon the mode of preventing the spread of epidemic disease from one country to another, the discussion being opened by Surgeon-General J. M. Cunningham. Professor Proust, of Paris, will follow with a paper upon the measures to be taken with regard to ships coming from infected or suspected countries, in order to prevent the importation into Europe of transmissible diseases from abroad.

Inspector-General Lawson will read a paper on the communicability of cholera from country to country.

Amongst those who have expressed their intention to take part in the discussion are, the President, Dr. Janssens of Brussels, Dr. Felkin,

of Edinburgh, Dr. A. J. Martin, of Paris, and Dr. Stekoulis, of Constantinople. Other papers will be read and discussed, as may be arranged hereafter.

On August 12th, a discussion will be held upon Diphtheria, with special reference to its distribution, and to the need for comprehensive and systematic inquiry into the causes of its prevalence in certain countries or parts of countries, with a view to its prevention. This discussion will be opened by Dr. Edward Seaton. Dr. Schrevens, of Tournai, will follow with a paper on the modes of contagion of diphtheria, and other papers on diphtheria are promised by Mr. C. E. Paget, of Salford, Professor D'Espine, of Geneva, and Professor Eugène Hubert, of Louvaine. Papers on others subjects will also be read and discussed.

On August 13th a discussion will be held upon the relation of alcoholism to public health, and the methods to be adopted for its prevention. The discussion will be opened by Sir Dyce Duckworth, M.D., and by Professor Westergaard, of Copenhagen. Further communications upon the same subject are promised by M. Milliet, of Berne; M. Canderlier, of Brussels; Dr. Baer, of Berlin; Dr. Norman Kerr, Dr. Isambard Owen, and Mr. J. J. Phillips.

On August 14th, Surgeon-General Bostock, C.B., and Sir Vincent Kennett-Barrington, delegates from the Metropolitan Asylums Board, will communicate papers, illustrated by maps and diagrams, on the Hospital Ambulance Organisation of the Metropolitan Asylums Board, for the removal and isolation of cases of infectious disease.

The papers read in this section, for which dates have not yet been fixed, are numerous, and include:—On the need of special measures for the prevention of consumption, by Dr. Ransome, of Manchester; on the influence of soil on the spread of tuberculous diseases, by Professor Finkelnburg, of Bonn; on the improved hygienic conditions of maternity hospitals,

by Dr. Priestley; on the technical requisites of animal vaccination, by Dr. B. Carsten, of the Hague; on the influence of the Nile on mortality in Egypt; on the prevention of disease in growing towns, by Surgeon-General Beatson; on the prevention of fevers in India, by Sir Wm. Moore, K.C.I.E.; on the prevention of the spread of epidemic influenza, by Dr. Sisley; on the prevention of blindness, by Dr. Van Dvoremaal, of The Hague; on malaria and enteric fever in Central Africa, and on the possible antagonism between malaria and phthisis, by Dr. Felkin; on the geographical distribution, pathological relations, and life history of *Filaria sanguinis hominis diurna* and *Filaria sanguinis hominis persans*, in connection with preventive medicine, by Dr. Patrick Manson; with papers by Professor Pistor, of Berlin, Professor Gunther, of Dresden, and others, the titles of which have not been furnished to the secretaries.

Division I., Section 2, Bacteriology, under the presidency of Sir Joseph Lister, Bart., F.R.S.—The work of this section will be divided into a series of (1) Discussions on special subjects, and (2) Papers on the general relations of micro-organisms to disease. The subjects proposed for discussion are (a) Immunity, Natural occurrence, and Artificial production; (b) Tuberculosis in man and in animals (in conjunction with Section 3). Papers will be read in the general characteristics of micro-organisms, morphological, biological, and chemical; on the relations of micro-organisms to specific infective diseases, *e.g.* typhoid fever, cholera, diphtheria, malaria, pneumonia, etc.; and on the action of disinfectants. A special feature of this section will be a museum and laboratory, suitable for purposes of demonstration of methods and the exhibition of cultures, apparatus, photographs, etc.

Section 3. The relations of the diseases of animals to those of man. President, Sir Nigel Kingscote, K.C.B.—August 11th—Papers on

the propagation and prevention of rabies, by Dr. Roux, Pasteur Institute, Paris, Dr. George Fleming, C.B., and Victor Horsley, F.R.S.; also on animal parasites communicable to them, by Professor Ralliet, of Alfort, Dr. B. Carsten, of Amsterdam, and Prof. G. T. Brown, C.B. On the 12th of August papers will be read by Dr Brieger, of Berlin, and Dr. Ballard, F.R.S., on the infection of food; by Dr. Klein, F.R.S., on infectious udder diseases of the cow in relation to epidemic diseases in the human subject; and by Dr. Ostertag, Berlin, and Dr. Francis Vacher, M.O.H., Birkenhead, on the inspection of meat with regard to the prevention of disease. On August 13th, a joint meeting of sections 2 and 3 will be held to consider the question of tuberculosis in all its bearings, and papers will be read by Prof. Bang, of Copenhagen, and by Drs. McFadyean, and Dr. Sims Woodhead, on the alleged danger of consuming the apparently healthy meat and milk of tuberculous animals. Other papers to be read in this section, on August 14th, will be on the infectious diseases of animals communicable from animals to man, or *vice versa*; by Professor E. Perroncito, of Turin, and Professor Edgar Crookshank; on anthrax and its relations to workers in various trades, by Professor Chauveau, of Paris, and Professor Duguid; on veterinary hygiene, by Mr. Fred. Smith, M.R.C.V.S.

Section 4, Infancy, Childhood, and School Life, will have for president Mr. Diggle, chairman of the London School Board. The programme of subjects will be as follows:—1. *The Child under normal conditions.*—His education; hygiene of schoolrooms; their construction, apparatus, etc.; effects of posture and defective lighting; distribution of time for educational purposes, mental and physical; physical, manual and technical instruction; the use of the playground, etc. 2. *The Child under abnormal conditions.*—(A.) Destitute children; existing treatment by the State, and by philanthropic agencies;

the provision of food and clothing in connection with the day school; crèches; boarding out system as contrasted with the poor law district school. (c) Children with criminal tendencies, or under the influence of criminal surroundings: their treatment in industrial and reformatory schools; truant day and industrial schools; the working of the Industrial Schools Acts Amendment Act, 1880.—3.—*The Child Imperfectly Constituted.*—(a) The education of the blind: its methods; ought it to be carried on in common with that of children having sight? (b) The treatment of the deaf and dumb: the speechless children; the non-hearing children; the deaf-mutes; the diagnosis of each of these three in reference to mental capacity; the best method of educating them in day and in boarding schools. (c) The care of the crippled and epileptic: the mentally feeble and imbecile child; method of dealing with each class. 4.—*The Hygiene of School Life.*—The annual average rate of progress of bodily and mental development; the causes which retard it; inherited tendencies; unhealthy sanitary conditions at home and at school; epidemics; defective personal hygiene. 5.—*The Law in relation to the Child.*—The protection of infant life; the insurance of children's lives; the employment of children; how now regulated by law in different countries; suitable employments; half-time at school; the working and results of the various systems. The following gentlemen have promised papers, treating of the foregoing subjects:—Prof Bergeren, Paris; Dr. L. Bürgerstein, Vienna; Dr. Desguin, Antwerp; Dr. Kuborn, Serang-Liege; Dr. L. Kotelmann, Hamburg; Dr. H. Gutzmann, Berlin; Dr. Jacobi, New York; Dr. C. E. Paget, Salford; and Drs. Schofield, Warner, Fletcher-Beach, Campbell, and Sturges, Colonel Prendergast, and Messrs. Arbuthnot Lane and Moberley, of London.

Section 5.—Chemistry and Physics in relation to Hygiene; president, Sir Henry Roscoe, F.R.S., M.P. On August 11th an address will

be delivered by the president; after which there will be a discussion on town fogs and their effects, including smoke prevention, opened by Dr. W. J. Russell, F.R.S. On August 12th a discussion will be held on the chemical and physical principles involved in dealing with sewage. On August 13th the subject for discussion will be the chemical and physical examination of air, water, and foods. On August 14th a discussion on meteorology will be opened by Lieut.-General Strachey, F.R.S. The list of papers to be read in this section is not yet published.

Section 6.—Architecture in relation to hygiene; president, Sir Arthur Blomfield, F.R.I.B.A., A.R.A. Sub-section 1.—Laying out and extension of towns. (a) Reservation of open space for purposes of light and air, for means of communication, and for recreative and ornamental purposes. (b) Streets and ways, alignment, width of roadways and footways, paving, boulevards, subways, business thoroughfares, shops, arcades, markets, mews, street refuges, public conveniences, line and height of building frontages, projections. Sub-section 2.—Buildings, site, aspect, curtilage, materials, exclusion of damp and ground air, basements and areas, roofing, collection and storage of rain water, water supply, sanitary appliances, drainage, external and internal surfaces, walls, floors, ceilings, partitions, lighting (natural and artificial), ventilation, heating by hot air, hot water, and steam, open fire-places, close stoves, consumption of smoke. (c) Private dwellings, self-contained houses, residential flats. (d) Artisans and labourers' dwellings, common lodging houses. (e) Trade premises and workshops, factories, restaurants, bakehouses, dairies and milkshops, laundries, cowsheds, stables and mews. (f) Public buildings, hospitals, infirmaries, asylums, educational institutions, gymnasia, places of worship, theatres, public halls, hotels, courts of justice, prisons, police stations, coroners' courts, mortuaries, markets, abattoirs, baths, wash-houses.

Section 7.—Engineering in relation to Hygiene; president, Sir John Coode, K.C.M.G., Past President of the Institution of Civil Engineers. Sub-section 1.—Sewage and Sewage Disposal. (a) Water - carriage system: construction, gradients, and ventilation of sewers, separation of sewage from rain-water, exclusion from rivers of rain water from streets and roofs, sewage disposal, discharge of crude sewage into tidal waters, discharge into tidal waters after deposition of solids, irrigation and filtration, chemical treatment, electrical treatment. (b) Other systems; the collection and disposal of sewage by systems other than those where water is used. Sub-section 2.—Water Supply: collecting areas, quality and quantity of water collected, quality of water for drinking, storage and service reservoirs, subterranean sources of supply, geology as affecting water supply, filtration and purification of water, softening of water, distribution of water, separation of supply for drinking and other purposes, utilisation of sea water by distillation for drinking purposes, also for watering and cleansing streets, and for flushing purposes, the effect of subsoil water on health. 3.—Pollution of rivers: prohibition of pollution, modes of prevention as regards sewage, chemical, manufacturing, mining or other refuse, the spread of disease by polluted rivers, the self-purifying power of rivers. Sub-section 4.—Town refuse: collection of refuse and its disposal, by fire, by conveyance to the sea, by chemical destruction, and by disposal on land.

Section 8.—Naval and Military Hygiene; president, the Right Hon. Lord Wantage, K.C.B., V.C. It is proposed to divide the work of this section into two sub-sections, viz.: 1. Subjects connected with the Royal Navy and mercantile marine; 2. Subjects connected with the army, auxiliary forces, and ambulance. The subjects which will be dealt with in the first subsection are as follow:—Modern systems of quarantine, their objections and difficulties—alternative, medical inspection; port infectious

hospitals, their construction and control; disinfection; sanitation afloat—construction of vessels, with reference to crews' quarters, ventilation and warming, and the necessity of supervision of building; diet scales for the Royal Navy and mercantile marine; scurvy; diseases prevalent amongst seamen, their causes and prevention; means of transport of sick and wounded afloat, and from ships to hospitals. In Sub-section 2 the subjects will be: Health conditions affecting troops in garrison and on field service, including the measures to be adopted on the outbreak of any epidemic or infectious disease, the simplest and best modes of adapting practical hygiene to the exigencies of modern war; the races, ages, and temperaments most suitable for military service; the construction of huts, barracks, and hospitals, and the formation of camps; diet, more especially in reference to climate and nature of service; clothing and equipment in reference to health and efficiency; the simplest and most effective methods of affording aid to, and transporting, wounded men in time of war; practical regulations for troops in garrison, at the base, in the field, and afloat, during war.

Section 9.—State Hygiene; president, the Right Hon. Lord Basing.—Subjects for papers and discussion:—A. The organisation of a health department of the State, and its proper relation to other public departments; should the State undertake scientific investigations into the origin and causes of disease, and, if so, by what methods? What area should constitute the unit of sanitary administration? B. The duty of individuals to their communities, of communities to individuals, and of states and communities to each other in respect of health. What steps should the State take to prevent the spread of small-pox, the spread of venereal disease, and the incursion of foreign epidemics? To what extent should the State exercise control, in the interest of public health, over the analysis of food and drugs, the sale of poisons, and the sale of alcoholic liquors? What action should be taken by the

State in regard to the sanitary registration of houses, the enforcement of specific minimum sanitary provisions for houses, villages, and towns, and the housing of the poorer classes? C. The education, position, and duties of medical officers of health, sanitary inspectors, artisans employed on sanitary work, *e.g.*, plumbers and midwives? The need for popular instruction in hygiene and physiology in regard to health. D. The notification of infectious diseases, and the action to be taken in respect of the notification. Should compulsory notification be made general? State registration of infectious disease. Should sanitary authorities be compelled to provide isolation hospitals for infectious cases? Should they be given powers to compel the removal of any, and what, cases of infectious disease to hospitals? Should the disinfection of houses, clothing, bedding, &c., be carried out by the individual or by the sanitary authority? What powers should be given to sanitary authorities in regard to milk supplies, work carried on in infected houses, work carried on by persons living in infected houses, the quarantine of persons exposed to infection, and the provision of temporary shelters for persons in whose houses disinfection is being carried out? E. The disposal of the dead, cremation, intra-mural burial, burial grounds generally. F. The growth and development of sanitary practice in different countries.

Division II. Demography: President, Francis Galton, F.R.S. On August 11th, after an address by the President, a discussion will be held upon disease and mortality in reference to occupation, and the effect upon output, of hours and remuneration of labour, respectively.

On August 12th a discussion will be held upon the suitability of tropical high lands for European settlement; the predisposition of the black and white races, respectively, to various infectious diseases, in its bearing on racial distribution; and the migration of labour. On August 13th will be read a report by Dr. George von Mayr, of Munich, on "Insurance

Societies of the Working Classes," in pursuance of the resolution passed at the Vienna Congress. A discussion will be held on this report, and upon the more systematic collection and utilisation of demographic statistics. On August 14th a discussion will be held upon the physical condition of children at school, and anthropometric facts and inferences. It is expected that many other subjects besides those specially named will be brought before the demographic section for consideration, the suggested subjects being:—1. Marriage and birth: Marriage and birth rates in the various classes of the population; illegitimacy; registration of still-births; premature employment of women after child-birth. 2. Disease: Diseases in their relation to occupations; influence of sanitation on efficiency of labour; statistics of friendly societies; hospital statistics; increase or diminution of any important disease. 3. Death: Influence of race or family on mortality; mortality in relation to age, sex, occupation, and hygienic conditions. 4. Occupation: The comparative results of factory and home labour economically and socially; hours and remuneration of labour, and their effect on health and on output; employment of women and children; effect of factory legislation on health in various countries. 5. Race and Locality: National characteristics as modified by geographical conditions; causes of mortality in towns; degeneration in physique of town workers; geographical distribution of disease; tolerance of tropical climates by European races. 6. Changes in Population: Census-taking; emigrations from country to town and from nation to nation; free, aided, and restricted migration. 7. Food: Food and its preparation in relation to work in different countries; the comparative increase of food supply and of population; stimulants and narcotics in their industrial and moral aspects. 8. Anthropometry: What can physical anthropometry teach? What new measurements are desirable and feasible? Criminal anthropometry; national and racial aptitudes.

The social arrangements made for the entertainment and amusement of the members during the period of the Congress are varied and considerable. The College of Physicians and the College of Surgeons will each give a conversazione; the Court of Common Council will entertain the members at the Guildhall on August 12th; the members of Congress will dine together at the Crystal Palace, on August 13th, and in the evening a special display of fireworks will be given; garden parties and private entertainments will be given in the course of the week by the Baroness Burdett-Coutts, Sir Spencer Wells, Bart., Sir Edwin Saunders, and others; the Sanitary Institute has arranged for a reception at the Parkes Museum on August 13th; and the Royal Botanic Society and the Zoological Society have consented to allow members to have free admission to the Botanic Gardens and the Zoological Gardens during the session of the Congress. Special facilities will be afforded for inspecting the principal public buildings and works in London; and many municipal and county authorities have expressed their intention of affording to members of the Congress facilities for viewing the sanitary works and public institutions under their care.

Our space will not permit of our giving the lists of the various committees, which include a number of medical and scientific men of the highest eminence in every section. The honorary secretaries are Dr. G. V. Poore (general secretary) and Prof. W. H. Corfield, M.D. (foreign secretary), to whose exertions, with those of Sir Douglas Galton, is mainly due the circumstance of the Congress being held this year in London.

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#### LANDLORDS' LEGAL RESPONSIBILITIES FOR INSANITARY DWELLINGS.

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A CASE of considerable importance was heard on June 12th before Mr. Justice Day and a common jury, in the Queen's Bench Division,

The plaintiff, a carpenter, of the name of Vallance, sued the defendant, named Cartwright, for damages in respect of the death of plaintiff's daughter from diphtheria, which disease she had contracted through the defective drainage of a house at Tottenham, of which plaintiff was the tenant and defendant the landlord.

Plaintiff's case was that the defendant, through his agent, had warranted the house to be in a sound sanitary condition. On the other hand, the defendant, while admitting that the death of the plaintiff's daughter had occurred through diphtheria, denied warranty and knowledge of the defects, and alleged that the plaintiff had himself tested the drains, and ought to have been aware of their condition.

The circumstances of the case, as set forth by plaintiff's counsel, were the following:—The plaintiff held the house upon a weekly tenancy, paying 9s. 6d. a week, and his wife carried on in it the business of a shirt and collar dresser, her loss of business consequent on the outbreak of diphtheria forming a part of the damages sued for; she was assisted in her business by a daughter, 17 years of age, who died of diphtheria after a brief illness. Upon examination the drains were found to be in a very faulty state, there being a hole in the pipe, while the pipes were not properly cemented, were on a wrong level, and permitted the escape of sewage gas. Further inquiries were instituted, and it was ascertained that, previous to the plaintiff's becoming the tenant, there had been deaths from diphtheria in the house. It was also stated by counsel that complaints about the drainage were made to the defendant's agent before the plaintiff's daughter died, but that no heed was taken of them. After hearing the evidence for the defendant, which consisted partly of a denial of the facts stated by plaintiff's witnesses, and partly of assertions that the defendant had done all that could be legally required of him, the trial resulted in a verdict for the plaintiff for £61, with costs.

An analogous case to this was tried a few

months ago in the Queen's Bench Division, before Mr. Justice Cave and a special jury. The action was brought by a City accountant, Mr. Farries, to recover damages in respect of expenses incurred and loss sustained through his having been induced to take a house by a misrepresentation as to its sanitary state. The plaintiff took a house at Forest Hill, of which the defendant, Mr. Hill, was the trustee, and after plaintiff's family had lived in the house for a short time they were attacked with scarlatina, and subsequently with diphtheria, the result being that one of the plaintiff's children died. Medical evidence attributed the outbreak of illness to the insanitary condition of the house, and this was shown on investigation by the sanitary inspector to be due to the connection of the waste water pipes with the soil pipes, a system which should never be permitted, being constantly fraught with danger to the inmates of the house where it exists. The defendant's case was that he did not, as asserted by the plaintiff, absolutely guarantee the perfect sanitary condition of the house, but only expressed his belief in it, being warranted therein by the fact that the previous tenant had made no complaint, and that the house was under the inspection of a competent builder. The defendant also made a counter-claim for £34, a year's rent, on the ground that the plaintiff had left the house after six months' occupation, refusing to pay any rent on account of what had happened. The jury found a verdict for the plaintiff for £85 on his claim, and also found for the plaintiff on the counter-claim. Judgment was delivered accordingly with costs.

*Salus populi, suprema lex* would seem to have become more than a mere axiom, judging by the frequent decisions bearing upon the question of the duty of landlords to take proper precautions as regards the hygienic condition either of houses or of apartments let as lodgings; for in a third case heard in the Queen's Bench Division during the past month, before Mr. Justice Grantham and a jury, a visitor to

Bournemouth recovered £150 damages, with costs, from a lodging-house keeper for putting him and his family into damp beds, in consequence of which the plaintiff suffered for some months from rheumatic fever and sore throat, while his wife and two children were also ailing for some weeks.

There is apparently some misapprehension as to the extent of a landlord's liabilities in respect of the sanitary condition of dwellings of the cheaper class; but, as a matter of fact, they are better protected than those occupied by more wealthy individuals, for though at common law in the case of an unfurnished house there is no warranty (as in the case of a furnished house) that it is fit for habitation, yet by the Housing of the Working Classes Act, 1890, it is specially provided (section 75) that "in all contracts for letting for habitation by persons of the working classes there shall be implied a condition that the house is at the commencement of the holding in all respects reasonably fit for human habitation." We agree with the remark made by Dr. Grigsby, LL.D., in a letter written to the *Daily News* on this subject, that this useful provision might with great advantage to the community be extended to all houses, whatever the amount of their rent might be.

In the case of any person letting for hire, or even showing for the purpose of letting, any house or part of a house, and making false statements as to the existence of any case of dangerous infectious disorder in such house within the previous six weeks, such person is liable, under the Public Health Act, to a penalty not exceeding £20, or one month's imprisonment with or without hard labour, at the discretion of the magistrate. Further, in accordance with the provisions of the same Act of Parliament, anyone who lets rooms in which there has previously been any person suffering from dangerous, infectious, or contagious disease, without having had the apartments thoroughly disinfected before re-letting, is liable to a penalty not exceeding £20.

L. E. X.

## VEGETARIANISM.

By DR. ALFRED J. H. CRESPI, of Wimborne,  
Late Editor of the *Sanitary Review*.

THE rapid and ominous rise of late years in the price of animal food in nearly all parts of the United Kingdom is attributable to the diffusion of wealth, which has largely increased the number of persons able and willing to consume meat, to the growth of population, and to the obstacles to an unlimited addition to the meat supply. The newspapers have exhausted their ingenuity and proposed many remedies, such as importing, on a large scale, live cattle from South America and fresh-killed meat wrapped up in linen, or protected from decomposition in other ways; and much has been accomplished, I must confess. Indignant householders have clamoured for co-operation as an infallible remedy, there being such a mysterious charm in a loud-sounding, fresh-coined word. The fact nevertheless remains—that with a growing demand for meat there is proportionately a diminishing supply; and a steady rise in price necessarily follows. The many suggestions made, whether practicable or not, are insufficient to meet the difficulty. Foreign supplies of living animals, fresh-killed carcasses, and preserved tinned meats, although of immense importance, are insufficient, and meat continues dear. To what extent the rise in price has been carried it is difficult to ascertain, as the retail and the wholesale prices constantly fluctuate, so that different authorities give very dissimilar estimates. In London, meat that a generation ago fetched sevenpence a pound, now seems to command something like a shilling, and in small towns, like Honiton, in Devonshire, there has been a proportionate rise. I am positively assured that fifty years ago legs and shoulders of pork could be purchased in North Devon at three-pence a pound retail, and legs of mutton at fivepence or sixpence. In this very town of Honiton, where I originally wrote this article, although meat is not unusually dear or scarce,

beef fetched, a week ago, from 12s. 3d. to 12s. 6d. the score, or about 8½d. the pound, wholesale, a rise in price that may well alarm frugal housekeepers. Instances as discouraging could be furnished from almost every part of the three kingdoms. At Wimborne, in Dorset, with a splendid meat market, I have paid this very month elevenpence a pound for legs of mutton.

What is to be done is the inquiry of many housekeepers? Meat must be had; but if it is so dear the proportion of the family income needed to pay for it is too large to be uncomplainingly appropriated. Butchers and co-operative stores cannot supply an unlimited demand, although to the consumption of animal food there is practically no limit. Were the present enormous supply doubled, there is every reason to believe that complaints would be as rife as ever that the supply was inadequate to the demand, and that more meat was imperatively needed. Nay, a month's supply could be got through in a week, and still the number of the dissatisfied would not be small. But suppose we hint that the value of meat as a food has been enormously overrated, is not a loophole of escape offered? Surely, if other food can take its place, the fears of housekeepers will be appeased. Suppose we advance another step, and assert that science and experience have proved, beyond all possibility of doubt, that health and strength can in this temperate climate, and probably in all parts of the world, except (according to Sir Henry Thompson) in the Arctic regions, be sustained in vigour without any form of animal food; nay, more, that the cheapest and most wholesome dietaries are those from which animal food is scrupulously excluded—what is the obvious conclusion? Why, the apprehension of an insufficient meat supply vanishes. I will not say that vegetarianism has been incontestably proved to be more wholesome than a mixed diet, although it has been shown to be as wholesome, satisfying, and, what is more frequently questioned, palat-

able, while, when rightly set about, its extraordinary cheapness cannot be denied. The Vegetarian Society of Manchester has seen its opportunity, and zealously pushing forward has laboured to interest the nation in the question which it is its province to force into prominence. The late secretary of the society, the Rev. Bailey Walker, and its illustrious president, Emeritus Professor F. W. Newman, have, on the platform and by means of manifestoes, exerted themselves strenuously and with encouraging success. Able articles on the subject have been contributed by members of the society to reviews and magazines, and though there has been opposition, the attacks have been principally directed against vegetarians as men, and against some of their pretensions, rather than against their views and practice. The economy and wholesomeness of a pure, unmixed, vegetable diet can no longer be disputed, and are now generally conceded in scientific and medical circles; so, for that matter, is the value of total abstinence from alcoholic beverages. Now I must caution my readers not to misunderstand me, and to fancy that my words convey more than is intended. I have said that both vegetarianism and total abstinence are admitted in scientific circles to be wholesome and economical; but it does not follow that they receive generous support and are carried into practice. Everyone admires and extols the Christian graces, but few are those who cultivate them. Medical men unanimously admit the economy and advantages of total abstinence, and do not attempt to dispute the wholesomeness of vegetarianism; but in practice they generally throw ridicule on both, and by their faint praise do more harm than open censure would effect. It is one thing to admit the scientific arguments in support of a particular line of conduct, another generously and candidly to follow it. Vegetarianism and total abstinence have received a cold and formal scientific sanction, and with this their disciples have for the present to be satisfied.

As a dogmatic assertion would not convince many of my readers of the truth of the foregoing statements, I shall attempt to deal, in the first place, with the scientific grounds on which vegetarianism rests. Food is divided into two great classes, the organic and the inorganic; that is to say, those that have possessed life and those that have not. The latter are of incalculable service in the metamorphosis of organic food in the living body, and comprise saline and mineral matters and water. We cannot yet tell why iron, sulphur, chloride of sodium, phosphorus, and fluorine are indispensable to the maintenance of life, but we know that they are; and the brain, the bones, and the blood, and indeed every living tissue, incorporate into their structure some mineral matter. The organic constituents of food may be divided into several classes, but whether derived from the animal or the vegetable world, or comprising portions of both, always include carbonaceous and nitrogenous compounds; the former are divisible into the hydro-carbons or fatty, and the carbo-hydrates or starchy and saccharine. Now as the phenomena of nutrition principally depend on the interchange of oxygen with nitrogen and carbon under the stimulus of that subtle something called life, it is also possible to consider the nutritive values of foods according to the quantities of carbon and nitrogen present in them. But since the value of the carbonaceous constituents of sugar is little more than two-fifths that of those of fat, it becomes necessary to calculate carbon in such a way that, whether contained in fatty or in starchy compounds, it should be reduced to some common measure. Starch is generally adopted for this purpose. The nutritive values of different foods may be correctly represented by the grains of carbon and nitrogen which a pound of them, freed from water, contains. The difficulty that next presents itself is this: —if at least two hundred grains of nitrogen and four thousand of carbon must be contained in the daily food, to support life and strength, would any wholesome food, whatever its source,

provided it contained these quantities of nitrogen and carbon, satisfy the requirements of the human system? We can positively and emphatically answer, Yes, provided the diet is pleasantly varied and well cooked. But suppose additional proof is demanded. It is forthcoming. We have discovered that all foods contain certain alimentary principles chemically identical, whether derived from the animal or the vegetable kingdom. On a proper supply of these alimentary principles the human body is dependent, and on their being supplied in sufficient and scientific proportions the maintenance of life and health hangs. This statement requires illustration. Nothing would have been easier than to construct dietaries consisting of flesh or vegetables alone, or of both in agreeable proportions, any of which might have contained almost exactly two hundred grains of nitrogen and four thousand of carbon. But interminable and acrimonious disputes would have raged as to whether the vehicles in which these quantities of carbon and nitrogen were conveyed into the body were wholesome or not. It is now known that all foods contain nitrogenous and carbonaceous compounds—as for example, albumen, legumen, fibrine, syntonin, glutin, casein, starch, and cellulose; and *this* is the all-important fact—that the chemical composition of some of these alimentary principles, whether derived from animal or from vegetable sources, is not only nearly the same, but chemically indistinguishable. The casein of milk cannot be told from that of peas and beans; the fibrine of meat is like that of wheaten flour and the cauliflower; the albumen of the cabbage and that of the white of egg are identical; and animal and vegetable cellulose are alike. The ablest and most skilful chemist would be unable to tell the source, animal or vegetable, from which perfectly pure specimens of these principles, separated from all foreign matters, were obtained. What a discovery this is! It amounts to saying that science cannot point out any difference between pure

and wholesome alimentary vegetable principles and animal ones, simply because there is no difference. Thus we see how strongly we can maintain that a vegetable diet, whether it includes milk, cheese, and eggs, or not, can be wholesome, and can supply the body with everything it can possibly need. That is tantamount to saying that health and strength can be as easily sustained upon it as on a purely animal diet or a mixed one. But we have not quite disposed of our difficulties, and to what follows I must request the reader's close attention. Alimentary principles are rarely eaten pure, but in the vast majority of cases are taken combined with a variety of flavouring and colouring matters, and to these the articles of our diet owe the peculiar and subtle differences which make one food apparently unlike another; and it is these flavouring matters that make one food palatable and another nauseous. It has been asked whether it might not be found that the savoury flavours of meat stimulate the palate and promote digestive processes. As a set-off, the disciples of vegetarianism contend that it is precisely these rich and subtle flavours which make animal food injurious, and that all-wise Nature intended man to live on simpler and purer food. Although many eminent physiologists endorse the vegetarian arguments, who can decide when doctors disagree? The highly-flavoured and rich dishes brought to the tables of the wealthy are tempting to the palate and pleasing to the eye; but their use makes it difficult to enjoy and thrive on purer and simpler food. From rich and stimulating dishes come disease, indigestion, and death, while simple diets are conducive to long life and sound health; and although nothing is easier than to acquire the taste for highly-flavoured animal food, it is perfectly easy for those accustomed to an unmixed vegetarian diet to enjoy it. All theories, to make them of value to mankind, must be brought to the test of experiment. Experience on the largest possible scale, extending over many centuries, shows that per-

sons who restrict themselves to a vegetarian diet enjoy vigorous health and remarkable immunity from disease, nor can it be urged that their enjoyment of life is in any degree diminished. It is not necessary for a Vegetarian to be an ascetic, and deny himself the enjoyments of the table. The digestive organs are after a time strengthened and adapted, so that inconvenience does not follow the consumption of vegetables on a large scale. Radical and sudden changes in the mode of life are often attended by temporary discomfort; but it is astonishing how rapidly the stomach assimilates vegetables, and how soon its capacity for the digestion of meat diminishes: at last, indeed, the inclination for it vanishes.

One of the stock arguments in defence of vegetarianism might, one would suppose, be its undoubted cheapness. This does not receive the support of vegetarians, some, indeed, denying that there is any saving. They are right, if for expensive joints of meat, rich jellies, and game, they substitute costly foreign fruits and delicate puddings. But a scientifically and carefully constructed vegetable diet, whether including or excluding those animal products which do not require life to be sacrificed to obtain them—such as eggs and milk—can be made exceedingly economical, and would in any family effect a considerable saving. It is indispensable, to obtain the full benefits of vegetarianism, to train up children to do without animal food; the digestive organs are then better able to utilise to the utmost the cheap food on which they are called to work, while there is no craving for richer diets. Many nutritious and wholesome foods, such as oatmeal, maize, and barley-flour, which are or should be the sheet anchors of the vegetarian, but which, from a certain harshness of flavour require to be eaten from infancy to be perfectly agreeable, are seldom relished by persons who commence to eat them later in life.

Some of the vegetarian bills of fare which I

have seen—one more especially, submitted to me years ago by Professor F. W. Newman—have been quite as varied and rich as was compatible with health and economy, and no one could complain that they erred on the side of frugality. So far from condoling with vegetarians, there is room for rejoicing that they provide themselves with substitutes for meat that would satisfy the most fastidious epicure; and the chiefs of the Vegetarian Society sit down to tables plentifully supplied with delicate and savoury dishes which are as palatable as those containing meat.

This leads me on to another part of my great subject. Vegetarianism has claims on the general attention based on quite other grounds than its cheapness and wholesomeness, for it cannot be successfully practised where there is not careful and scientific cookery. Hence the labours of the Vegetarian Society are of immense moment, and rise above the level sometimes claimed for them; they encourage the economical and careful preparation of food, and bring before the nation the importance of many kinds of food comparatively neglected, but abundant and palatable. Vegetarianism could be practised with facility and economy in any family in which it was the custom of the household; but it would be a hardship, perhaps an actual impossibility, for one member to attempt it alone. In any case it would be easier and pleasanter for the whole family to give it a fair trial. The simplest rule that could be recommended to a person desirous of testing in his own household the advantages and economy of a pure vegetable diet would be to leave off meat and bacon at breakfast, tea, and supper, and at dinner to reverse the usual order of the courses. Let the meal begin with tarts, fruits, and puddings, and when everyone had had a sufficiency, the fish, poultry, or joint, which usually comes first, might be brought in. If the first course be really tempting and well cooked, no one would, in a week, care for meat, and it could be easily dispensed with.

One kind of vegetable food—fruit—is so delicious and wholesome, that were it only plentiful and cheap total abstinence from flesh would soon carry the day. Everywhere people delight in fruit, and children and savages eat it voraciously. Were it economical and abundant it would satisfy the most delicate palate, and deal a death-blow at meat; but its scarcity and dearness, in country towns more especially, are insuperable obstacles to its general consumption. There is small hope at present that the supply of fresh fruit will be materially larger in this country.

Two or three stock objections to vegetarianism demand a moment's consideration, although soon disposed of. A good deal is heard of the importance of concentrated food. Now, I confess I do not understand what is meant by this. Milk, universally admitted to be wholesome and nutritious, is not as concentrated as fish, nor is the latter as concentrated as maize. It would be easy to construct a vegetable dietary, comprising, in a given weight, as many grains of nitrogen and carbon as one of unmixed animal food; and beans, peas, lentils, and many kinds of grain are instances in point. Undoubtedly, weight for weight, vegetables are not as a rule as rich in nutriment as meat; but they are cheaper and more plentiful. Whatever it is taken to signify, this objection is of secondary moment, as the difference is not sufficiently marked to be serious. The claims of invalids—a second objection to vegetarianism—I do not propose discussing; the sick and the aged may possibly need, or fancy they need, rich animal food. My own experience in hospital and private practice leads me to believe that the infirm and the invalid are all the better for simplicity of diet and living, and are more often over than under fed; and Sir Henry Thompson certainly agrees with me as far as the aged go. Be that as it may, we are not all invalids and octogenarians. A third objection—that the supply of vegetables is small, and that it is impossible in large towns to procure them cheap and fresh—comes with a

bad grace from persons who, whatever their consumption of meat, dispose of three or four times as great a weight of potatoes, bread, rice, and cakes. No; the place of meat could be readily and economically supplied by vegetables and fruits, and in an increased consumption of the latter lies the true remedy for a scanty and dear meat supply. Looked at from whatever point of view, we cannot question the feasibility, wholesomeness, and economy of a liberal consumption of vegetables and fruits; nay, we can maintain that science and practice prove that they can, in every sense, take the place of meat, and even of all animal products. The palatableness of such a dietary cannot be disputed by anyone who likes fruit tarts and puddings, and enjoys bread and butter.

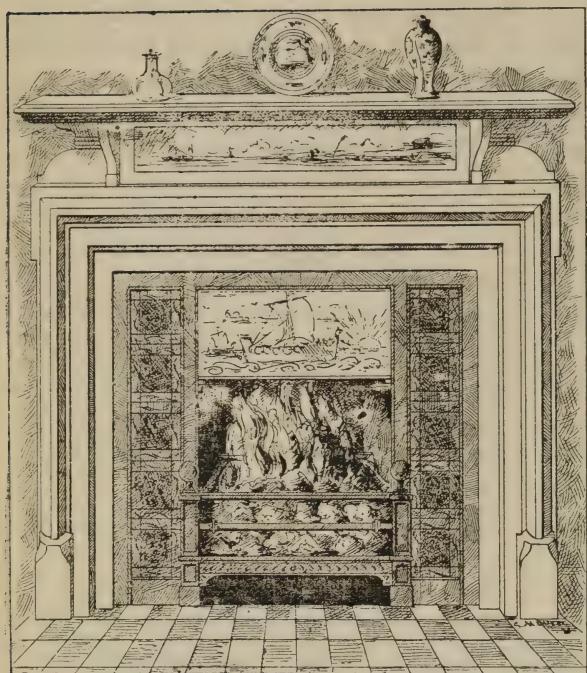
Meat must tend to become dearer and scarcer; and housekeepers will not less persistently and volubly utter their complaints. The only remedy is a greatly diminished consumption of animal food; but it appears to me that the real redress for heavy butchers' bills will be found in the larger and more systematic use of fruits and vegetables.

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#### SMOKE ABATEMENT.

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ONE of the results of civilisation for which no one has a good word is the coal smoke with which the atmosphere over all of our large towns is so greatly vitiated. And although the smoke of London is in ordinary weather not so dense or apparent as that of some of our manufacturing towns, yet it is, even in the brightest weather and throughout the year, an evil of great magnitude, an evil of both an aesthetic and a material character. It not only lessens the extent of view from commanding positions, but dims the brilliancy and beauty of that which is left. The famous prospect from Greenwich Observatory is quite spoiled, as are also those over London from Hampstead Heath, Primrose Hill, and other points, while even Richmond Hill is in danger of injury to its principal charm.



FIREPLACE FITTED WITH SMOKE FILTER (SHOWING PIERCED FRONT-PLATE).

The great streets of London, too, are despoiled of half their grandeur, and white stone and red brick are soon alike robbed of their due architectural effect, and so our best built streets are rendered gloomy and depressing.

The material injury done by the smoke-cloud is universally felt, and so the evil is costly to the inhabitants generally, to say nothing of lowered vitality and consequent greater liability to illness—to say nothing of the waste of fuel in the carbon given off, unconsumed. The amount of additional cleaning required for walls, ceilings, windows, curtains, furniture, and also for wearing apparel, caused by the smoke of London, has been estimated to cost annually many hundred thousands of pounds. There is also to be remembered the injury done to pictures, gilding, bookbinding, and to plants, flowers, and foliage, as well as the cost of the additional artificial light rendered necessary by the overhanging veil of smoke.

But though at all times a source of annoyance and injury, the smoke nuisance is

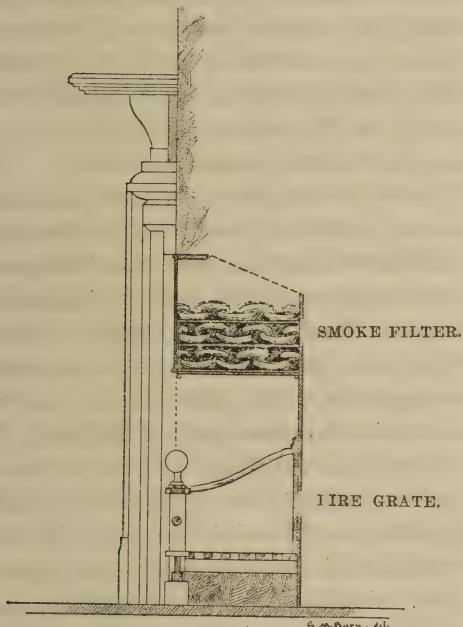
especially so during the winter when sunshine is rare and daylight is less in duration and power. It is, however, when fog fills the streets of London that the evil effects of the smoke are most intensified, for then it is held down, and thus the vapour-charged atmosphere becomes abundantly smoke charged also, and that most noxious result a modern "London fog" is produced. Year by year the darkness of the fogs of London increases with the growth of the metropolis, whereas with the drier air consequent upon the extension of the area covered by heat-giving human habitations, and hard, well-drained, and often quite dry streets and roads, fogs, were it not for the smoke, ought to diminish both in density and frequency in the metropolitan part of the Thames Valley.

The smoke of London has been grumbled at ever since the days of Charles II., when the "indignation" of Evelyn was kindled against it and his curious and quaint "Fumifugium" was written. Still, after 230 years, nothing calculated to cure the evil has been done. True it is that an Act exists to deal with the furnace-fires of the manufactories of London, but if every furnace completely consumed its smoke, the evil would be practically left untouched, for it is that produced by house fires that causes the great smoke-cloud over London. The number of house, office, shop, hotel, and club fires is so enormous, and they are so continuous in their extension over a wide area, that the smoke of furnace-fires is small in comparison, and in extensive districts quite infinitesimal.

To effectually attack the nuisance, therefore, the smoke from domestic fires generally must be lessened. But can this be accomplished? To this most important question we are prepared to answer, Yes; for at length an invention has been patented, applicable to all existing

fire-grates, that will arrest carbon in ascending smoke, and, retaining it for subsequent consumption, will thereby prevent its discharge into the outer air at the chimney top.

This smoke-filter—for such the invention is—will be found to be simple, enduring, and inexpensive, while it possesses the great merit of being easily fitted to all fire-grates, not only without disfiguring, but with highly ornamental results. There will, consequently, be no obstacle to its general adoption, and a general adoption of any smoke-consuming appliance is, of course, of the utmost importance. A new fire-grate that will greatly



diminish the smoke from its own fire may be produced, but as it will be used only in new houses and comparatively few old ones, it will be quite ineffectual in its general effect. The same may be said of the substitution of gas or other fuel for ordinary coal, which alone gives the cheerful and comforting and ventilating fire that English householders will always love. The smoke-filter also arrests heat that would otherwise pass up the flue and be wasted, and radiates it to the room, thus economising the

heat of the fire. It increases as well the brightness of the fire, improves the draught, cures "smoky chimneys," and renders virtually impossible "chimneys on fire." Thus it seems that a problem has at length been solved that has hitherto been regarded as almost insoluble.

The patent rights of the invention, which is that of a man of science, have been secured by the London Smoke Abatement Company, Limited, with a view to placing it before the public, and we understand that several smoke-filters in operation will shortly be exhibited, to give all interested in this subject—and who is not?—an opportunity of judging of their suitability for general adoption. As the patent appropriates the only principle apparently applicable to the end in view, that of filtration, and the invention is suited not only to fire-grates but to furnaces as well, the enterprise of the company will doubtless be amply rewarded.

#### BRITISH HEALTH RESORTS.—No. 14.\*

##### YARMOUTH.

Whose fishing through the Realme, doth her so much renowne,

Where those that with their nets still haunt the boundless lake,

Her such a sumptuous feast of salted herrings make,  
As if they had robb'd the Sea of all his former store,  
And past that very howre, it could produce no more.

—DRAYTON'S POLYOLBION, 1612.

THIS place is sometimes styled Great Yarmouth, though the prefix seems most unneces-

\* The object of this series is to direct attention to the merits of different British Health Resorts, too often overlooked and neglected by persons who are put to much expense, trouble, and loss of time, in visiting Continental Spas, instead of availing themselves of facilities open to them in their own country. No. 1, Hastings and St. Leonards; No. 2, Cornwall; No. 3, Droitwich and its Brine Baths; No. 4, Swanage; No. 5, Isle of Man; No. 6, Lowestoft; No. 7, Llandrindod Wells; No. 8, Rostrevor (Ireland); No. 9, Cromer and Yarmouth (Norfolk), and Rye and Camber (Sussex); No. 10, Brighton; No. 11, The Undercliff, Isle of Wight; No. 12, Bournemouth, by Rev. R. A. Chudleigh; No. 13, The Climate and Surroundings of Bournemouth; No. 14, Yarmouth. Any single number can be had post free by remitting seven stamps.

sary. We know of only one other Yarmouth in the kingdom, viz.—Yarmouth, in the Isle of Wight, which little village with its few hundred inhabitants is hardly likely to be confounded with the town forming the subject of the present article, and ranking as the largest watering-place on the east coast.

“If you have a grudge against any particular insurance company, purchase from it a heavy life annuity, go and live at Great Yarmouth, and draw your dividends until they ask in despair whether your name is Old Parr or Methuselah.” Thus wrote Charles Dickens years ago, in “*David Copperfield*,” and the fact which the inimitable novelist conveyed in his felicitous style holds good at the present day. Yarmouth is an undoubtedly healthy place, whether for permanent or temporary residence ; and being situated within easy reach of the metropolis, by the Great Eastern Railway, this pleasant Norfolk town is a favourite summer-resort for Londoners. Its open marine position, looking out direct upon the North Sea, its fine sands extending for miles, its bathing facilities, its varied amusements, and its accessibility by rail, all tend to heighten the popularity of Yarmouth ; and, although the “*season*” at this watering-place is reckoned to extend from the commencement of June to the end of September, those who prefer freedom from crowding find it an agreeable resort at other periods of the year, provided always—as the lawyers say—that the wind is not blowing direct from the east.

Like its neighbour, Lowestoft, Yarmouth lays claim to very considerable antiquity. Near to the parish church is a rising piece of ground called Fuller’s Hill, which is described by local guide-books as probably the spot upon which the first houses in Yarmouth were erected. Be this as it may, there is no doubt that at a very early period of English history, people from a distance interested in fishing enterprise visited this locality, and, some remaining instead of returning to their original homes, the town was gradually developed, the River Yare on the one

hand, and the North Sea on the other, furnishing facilities of communication with other places and ready sources of subsistence ; according to Camden, the site of Yarmouth was previously known by the name of Sardike Sand and Sardike Shore.

One thing that must strike every stranger as peculiar when making his first peregrination of the older part of Yarmouth is the long series of narrow passages running from one principal street to another, termed Rows, and numbering 145 in all, with houses on each side. Although none of these are sufficiently wide to allow of other than pedestrian traffic, many quaint, old-fashioned houses, dating several centuries back, bearing both external and internal evidence of great expense and labour being devoted to their erection and decoration, are to be found in them. In fact, old Yarmouth is full of interest to the antiquary and to the curiosity seeker.

That it has long been a town of considerable size and population, is evidenced by the circumstance that in 1348 no fewer than 7,052 persons died at Yarmouth of the terrible epidemic called the Black Death, in all probability a kind of typhus fever, engendered by neglect of sanitary arrangements, which, after ravaging the Continent, visited various parts of England. The total population of Yarmouth prior to this outbreak was estimated at 10,000, so that nearly three-fourths of its inhabitants must have succumbed to this dire disease, and been conveyed by the minority of survivors to the huge graveyard (proportionate in dimensions to the edifice itself) which surrounds the parish church.

One result of this heavy mortality was that it led to the cessation of a long-standing feud which then existed between Yarmouth and Lowestoft, owing to the struggles between the men of these two towns for the supremacy of the fishing and trade in herrings,—much bickering and bloodshed being the consequence of their coming frequently into collision. Subsequently, Yarmouth obtained a charter, and the Yarmouthians attempted to interpret the

charter in such a manner as to exclude the merchants of Lowestoft from purchasing herrings on the sea near to their own town. The ancient feud was consequently renewed to such an extent that the combatants fitted out armed vessels for the purpose of attacking each other on the high sea, and of carrying hostilities into the other's vicinity. At last the services of Parliament were called into requisition to adjust the quarrel and to settle the difficulty. Certainly, there was something to fight for, more than the mere glory of conquest; for a prodigious quantity of herrings are taken every season off these two ports. The official returns at Yarmouth in 1884 showed that between August 23rd and December 20th, 312,907,942 herrings were landed there; a sufficient evidence that there is no falling off in the apparently inexhaustible supply, especially when it is borne in mind that correspondingly enormous takes of fish are carried into Lowestoft harbour. During two days of November in a recent more than ordinarily good fishing season, 2,300 lasts of herrings (each last consisting of 13,200 fish) were landed at the latter place, making in round numbers over thirty millions.

An old writer, Nash, in a book entitled "Lenten Stiffe," and published in 1599, gives the following account of the origin of the Red Herring, with which the name of Yarmouth is inseparably connected. A fisherman, having taken so many fish that he could not dispose of them, hung some up in his smoky cabin; and he was astonished, some days afterwards, at finding that they had changed their colour from white to the "deaureate ruddie"—golden red—which distinguishes ham-dried bloaters at the present day. Both the fisherman and his wife were so amazed at this transformation that they fell down on their knees, blessed themselves, and cried out "A miracle, a miracle!" When they had recovered their equanimity enough to take a more practical view of things, the fisherman betook himself to Burgh Castle, near Yarmouth, where the King was holding his Court, to ex-

hibit these odd fish to his Majesty, who, "partaking of the fellow's astonishment, licensed him to carry them up and down the realm, as strange monsters." They are familiar now to the poorest in the land; even the wretched inmates of an Irish cabin, who scarcely ever know the taste of meat, can afford to have these "strange monsters" upon their table. By the way, have any of our many thousand readers ever seen a "one-eyed pheasant"? Before they have time to answer this question in the negative, we will ask them a second. Have they ever seen a red herring lying on its side on a plate, or on a fishmonger's slab? Then, they have seen this *rara avis*, this "strange monster," for a "one-eyed pheasant" is the facetious title given to a red herring by the lower-class Irish, whose miserable condition of life even cannot extinguish their native wit; the "one eye" is obviously that showing on the side of the fish which is uppermost, while its colour is suggestive of the real pheasant.

The parish church of Yarmouth, already referred to, is, like the adjacent burial ground, very large, and is, indeed, the largest parish church in England, its area being 23,265 square feet. It was founded in 1101 by Herbert de Losinga, the first bishop of Norwich, and enlarged from time to time by different benefactors, so that it is now capable of accommodating about 3,000 persons. At the period of the Reformation this edifice was, in common with many other ecclesiastical buildings, subjected to various despoilments and changes of its interior; but these were apparently nothing as compared with what took place during the Commonwealth, when it certainly needed to be spacious; for we learn from local records that, in 1650, three distinct sets of worshippers used this church for their religious services. The Presbyterians appropriated the north aisle, which they separated from the rest of the body of the church by filling up three large arches; the sect known as Independents occupied the chancel; and the Episcopalian, previously the

sole authorised tenants, were permitted to retain the remainder. What wonderful displays of the Christian virtues this tripartite arrangement must have given rise to on every Sunday! The most orthodox church and chapel goers give vent to very unorthodox remarks if, say, a favourite corn chancery to be knocked, or the hem of their garments trodden on, as they are leaving their place of worship, but what singular observations would be muttered, what glances of contempt and ill-concealed hatred would pass from one person to another, as Presbyterians, Independents, and Episcopalian jostled their respective religious opponents in passing out of the building after their devotions were concluded! Let us hope that one set of these were half-timers, and consequently got clear of the portals before their longer-winded brethren made their exit. Otherwise the effect, to use the slangy language of some of the young ladies of the present day, must have been "quite too awfully awful" to contemplate.

Various objects within the church are worth seeing. By the west door there is a curious seat, made of the base of the skull and the upper vertebrae of a large whale, which is said to have been washed ashore at Caister in 1582. A similar seat is described in *Household Words* for 1857. "In a garden in Clapham," says the writer of the article, "we have seen one of the huge dorsal vertebrae of a whale converted into a chair by being mounted on three wooden legs; the broad part makes a capital seat, and the projecting spines the back and sides of the chair." Mr. Lupson, who by the way is the parish clerk, mentions in an excellent guide book to Yarmouth that many years ago, in their zeal for painting, the persons responsible for the management of the church painted this whalebone seat at a cost of eight shillings, and also gave a couple of coats of white paint to the handsome Early English font, which is made of Purbeck marble. The pulpit is a very elaborate piece of workmanship, covered with figures of celebrated characters from the Old and New Testament, and various

scriptural subjects. The organ, constructed by Jordan, of London, in 1733, is a very fine one. The principle monument is that of the Fastolf family, who resided in Yarmouth in the 13th and 14th centuries. Sir John Fastolf, in the 15th century, built Caister Castle, now an interesting ruin, about three miles from Yarmouth.

Another interesting relic of antiquity is the Blackfriars' Tower, at the end of the town, which was one of sixteen towers placed upon the Rampart Wall, erected 500 years ago for the defence of the town. This wall was 2,240 yards in length, and pierced by ten gates. One of these, which was standing until 1837, was called the Pudding Gate, and led out to the Pudding Yard, where the butchers were obliged to deposit the refuse from their slaughterhouses, to which the term Pudding was applied. In an old book, Bohun's "Privilegia Londini," may be found the regulation that "the Pudding Cart of the Shambles shall not go afore the hour of nine in the night or after the hour of five in the morning, under pain of six shillings and eightpence," no small fine, considering that money was then several times its present value. Our ancestors were more keen upon the subject of sanitation than is now commonly supposed. The "Annals of Cambridge," 1575, make mention of the Pudding Pit as one of the six common "dungells" (dunghills) of that town.

The Tolhouse, an old name for a prison—in Scotch, Tolbooth, as all readers of Sir Walter Scott's novels are well aware—is in Middlegate Street. It was erected in the 13th century, in consequence of a charter granted to Yarmouth by Henry III., dated the 28th of September, 1261, by which the town was privileged to have its own gaol for the imprisonment of malefactors. Prisoners are now committed to Norwich Castle, and the gaol building is devoted to the more humane and civilising purposes of a Free Library. The Tolhouse is a good specimen of 13th century architecture.

Yarmouth abounded in monastic institutions

previous to the Reformation. The Priory (the old refectory of which is now used as a school-room) adjoined the parish churchyard, and the Black Friars had a large establishment where Friars' Lane now stands.

It will be interesting to our medical readers to know that Sir James Paget, Bart., F.R.S., was born at Yarmouth, in the house which is now the Government School of Act and Navigation. Sir Astley Cooper was also a native of Norfolk.

The Market Place of Yarmouth is one of the largest in the kingdom, and presents an animated scene on market days. In olden times still more exciting though less agreeable ones were witnessed, for this fine open space was occasionally used for the sport of bull-baiting, culprits were driven around its circuit and whipped at the cart tail, while others were placed in the pillory and stocks that stood here, and the Market Cross (taken down in 1836) was made the central point for the announcement of important public news. In the Commonwealth time it was usual to proclaim banns of marriage at the Market Cross.

The reference to this period of history reminds us that Yarmouth played a leading part in the political strife which led to the downfall of Charles I. The Yarmouth men were Parliamentarians during the Civil Wars, while those of Lowestoft, animated probably in some degree by their hostility to the Norfolk town, warmly espoused the Royalist cause. On one occasion Cromwell, learning that a design had been formed by the Lowestoft people, hastened thither with his troops, took possession of the place and of a number of guns and other war materials, in addition to which he made the principal inhabitants prisoners. At the South Quay, Yarmouth, is the house where it is believed that the execution of Charles I. was decided on. Oliver Cromwell was a frequent visitor at this house, which was the residence of John Carter, a great friend of his. Shortly before the unfortunate monarch's tragic

end, a meeting of the chief officers of the Parliamentary army was held at Carter's house. "They chose," says the chronicler, "to be above-stairs, for the privacy of their conference. They strictly commanded that no person should come near the room, except a man appointed to attend their dinner, which was ordered for four o'clock, but was put off from time to time till past eleven o'clock. Then they came to a very short repast, and immediately afterwards they set off post-haste, many for London, and some for the quarters of the army." Miles Corbet, whose signature was the last attached to the death-warrant of Charles I., resided at Yarmouth, in a house which is now a public-house, called the Weavers' Arms.

Yarmouth can boast of a splendid beach, with extensive sands, reaching several miles to the north and south. The outlook over the sea, the well-known Yarmouth Roads being in the distance, is magnificent. The marine parade, which faces the beach, possesses numerous hotels and boarding-houses, which are in great request during the summer, as well as those in other parts of the town giving accommodation to visitors.

There are two piers, the Wellington and the Britannia. Near to the latter is the Aquarium, in which various entertainments are provided. Continuing our course along the sea front we come to the Nelson Monument, which was erected after his death, to commemorate the great deeds of the Admiral, who visited Yarmouth in 1800. It is a very striking object, and can be seen for many miles, both on sea and on land.

Many pleasant excursions can be had by rail, road, river, and sea, from Yarmouth to places of interest in its neighbourhood. Amongst these are the ruins of Caister Castle, already spoken of, and of Burgh Castle, nearly 2,000 years old; Lowestoft, which can be reached by rail in half an hour; and the famous Norfolk Broads, expanses of water, situated a few miles

inland, abounding in charming summer scenery, and affording unlimited facilities for boating and fishing.

The principal kinds of fish in the Broads are pike (often very large, and over twenty pounds in weight), perch, roach, bream, carp, and rudd; together with grey mullet, which find their way at summer time in large shoals up the river Yare from the sea at Yarmouth. The chief of the Broads are Oulton (Oulton High House and the church are worth notice), Wroxham, Ormesby, Surlingham, Whiteslea, Marsham, Heigham, Salhouse, Ranworth, South Walsham, Hickling, Filby, and Burton. For beautiful scenery, healthful recreation, and thorough change, particularly in the case of persons who have been pent up in cities and towns, there is no part of England superior to the Broads of Norfolk and Suffolk. As we glide over them in our boat we cannot help wondering at the shortsightedness of people who put themselves to much expense, trouble, and loss of time in visiting Continental resorts, often overcrowded and uncomfortable, instead of going to the pleasant places within easy reach of them in their own country. W. A.

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## LONDON SEWAGE AND ITS DISPOSAL.

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By F. ALEXANDER.

IN Pandora's box Hope remained, but where shall hope be found in the report laid by the Main Drainage Committee before the London County Council?

Their investigations were prompted and prosecuted with a special view "to the prevention of disease" and "freeing the Thames from pollution." After carefully perusing their report, the "irresponsible," perhaps, but interested outsider can but form the conclusion that the resources of the nineteenth century, as appreciated by the official mind, are wholly inadequate to cope with that hydra-headed monster, London Sewage.

In their paper there is plenty of report, plenty of sludge, plenty of money, and, alas! an apparent plethora of possibilities in happy swimming grounds for our enemy the ubiquitous microbe.

According to recent analytical rumour, in the Thames he already holds his own fairly well, and, dolphin-like, gambols in graduating percentages in the various beverages supplied by the different water companies. But this is a mere foretaste of the good time awaiting him when the existing over-taxed sewers shall be supplemented by "new out-falls at a *suitable* point lower down the Thames" (the italics are our own) "and the effluent water from the Barking and Crossness Precipitate Works" precipitate themselves into the river.

It has been well asked in one daily paper, "What can a few tons of disinfectants do for the daily sewage outfall of our vast metropolis?"

Charles Kingsley wrote, in 1851, "The question which is forcing itself more and more on the minds of scientific men is, not how many diseases *are* but how few are *not* the consequences of men's ignorance, barbarism, folly," etc. The pollution of our rivers can hardly arise from ignorance, for, year in, year out, social reformers have preached that to drain into rivers is a wasteful, mischievous, short-sighted policy, fraught with danger and death to the community.

Shall we, then, put down the present clumsy system to barbarism or folly? The existing state of things is barbarous enough, as dwellers and persons whose occupation lie on the river know too well, crude sewage, malodorous winds qualifying the pleasure of the "sprightly race who still disport themselves where hoary Thames winds his (formerly yclept *silver*, but now) black greasy way." Should a young waterman unfortunately capsize, the chances are that he will be poisoned before he is drowned; such was the traditional fate of the trippers on the ill-fated *Princess Alice*.

It is folly also, for we are to spend

two and a quarter millions of capital and £80,000 per annum to convey to poison the deep sea fish what our exhausted land craves. Nitrates, phosphates, mummied cats, and even (be it whispered) the bones of heroic Turks, all are brought at great expense long distances to dress the hungry soil.

But why this waste? We presume because our engineers have yet to discover a practical way to bring the sewage and the soil in touch.

Earth, air, fire, and water!

Earth.—The earth system has failed. Theoretically it was sound, on an extensive scale practically impossible. First, from the difficulty of securing a regular supply of dry earth, and secondly, of storing the same. The system was tried in large Board Schools in the North of England, and resulted in a scandalous nuisance from the irregularity of the farmers in keeping up the supply of dried earth and removing the products.

Air.—The ventilation of our drains is a stride in the right direction; we no longer lay on sewer gas to our houses.

It is the nature of gas to rise; but why should it rise just off the pavement under the noses of the unwary passer-by, causing him perchance to fall a victim to diphtheria or scarlet fever. These infections fasten on the back of the throat. Why should the unoffending citizens be forced to inhale them? The ventilators of our drains should be carried up the lamp or telegraph posts, and where these would interfere with the fresh air of second or third floor windows let them, Excelsior-like, go higher, till they reach the tops of the houses.

Fire we will leave till the last, as the one untried remedy, and hasten on to water.

Water.—Cholera germs, bacilli, microbes, whatever men may like to call them, all prefer damp to drought; to properly develop, these minute bodies work best in damp gutters, decayed fruit, or some noisome, humid, unsavoury corner. Why, then, let them correspond with their environment by precipitating them into

the water to be carried hither and thither, thrown back perchance on our shores to multiply *ad infinitum*? In considering the present condition of the river Thames the Main Drainage Committee are of opinion "that it is essential to direct the most serious attention to the constantly increasing abstraction of upland waters by the various water companies, which they consider to be a potent cause of many of the grievances complained of in the middle and lower reaches." Here they are at issue with the Metropolitan purveyors of water, but not for the sake of the unlucky consumer, who, whilst imbibing Thames mixture, might appropriately sing—

Drink to fortune, drink to chance,  
While we keep a little breath;  
Drink to heavy Ignorance,  
Hob-and-nob with brother Death.

Which is the Thames to be, a drinking fountain or a main sewer? At present it is both. It should be neither.

In the north country the river Tees supplies water to several large manufacturing towns and their suburbs; the writer was once complaining there of having nothing better than diluted sewage for consumption. The Quidnunces were ironical and called the term exaggerated. "My dear friend, do you imagine for a moment that the water, after coming all these miles over peat, sand, rock gravel and filter beds is not perfectly safe?" We did imagine it, and were haunted by a fearful dread. Last year typhoid fever broke out in the first large town, and quietly and gradually spread, and extended to every town supplied with water by the Tees Company, whereas places in close neighbourhood that got their water from hill reservoirs were quite exempt from epidemic. Oh! for a Bacon to teach us practical science. The Laureatette says:—

Science moves but slowly, slowly.  
Creeping on from point to point.

Never has it moved slower than in the matter of water supply and the pollution of rivers.

We are asked to glory in the triumphs

of the telephone, the phonograph, and other marvels of this great Victorian Age. But till our doctors have found out a cure for rheumatism, and our scientists how hygienically to dispose of sewage, our Age had better be a little less braggart.

It is no doubt a grand thing to be within speaking distance of Paris! But how immeasurably a greater benefactor than even Edison would that man be who could once and for ever solve the question of how decently to dispose of and utilize sludge.

When we read the appalling statement of one of our leading doctors that each week he has to pronounce the death warrant on twelve fresh cancer cases, and note how alarmingly this class of affliction is increasing, can we be wrong in believing there is something very rotten in our sanitary arrangements, and that danger lurks even in the teetotal cup? Water, pure and simple, should consist of one part oxygen to two parts hydrogen. We dare not hazard what Thames water contains, but refer our readers to the last analytical report.

However, the Main Drainage Committee see nothing alarming in the analysis, for they calmly state that "during the past half century the river has never been free from sewage pollution, and experience has shown that, provided such pollution be kept within reasonable limits, no practical inconvenience results therefrom. We have seen nothing in past experience which would justify any alarm at the present state of affairs, or necessitate immediate action." . . . They add, however, that "after a most careful consideration of the question we have reluctantly come to the conclusion that there is no point in the estuary of the Thames, or on the Essex coast near thereto, where the whole volume of the future sewage could be discharged in a crude condition without risk of returning up the Thames and other rivers, and of offensive deposits and consequent evils arising therefrom."

Seeing that for about seven hours the water

of the Thames runs down towards the sea and for about five hours, during flood tide, back again, we think the fear of the Committee is well founded. This tidal movement of the river extends as far as Teddington Weir, nineteen miles above London Bridge. Floating bodies are therefore carried towards Teddington during the flood and towards the Nore during the ebb—with a two hours' start only in the latter case—and thus it is only by a happy chance that ultimately they are carried out to sea.

The Committee suggest that sludge ships should assist the river in this respect and convey a portion of the matter it is impossible to deal with at Crossness, by ship to the deep ocean. This is another clumsy, wasteful idea. Sludge means death to our fish supplies, and thus strikes a blow at a national industry and food.

Some years ago, and for centuries before, perchance from the time of the early Britons, a flourishing trade in fish was carried on near a small market town on the south coast. Men in blue Jerseys were posted on the high "look out" cliff to watch for the silver shoals beating up or down the blue waters of the English Channel. A joyful shout proclaims they are sighted, a rush to the sands follows. Push off the boats! The seines are cast overboard by eager hands and soon they land on the shining red sands the speckled silver struggling spoil.

Then rattle down to the scene the Somersetshire fish "Dukes" and the auction commences.

Rapid packing for the London market now supervenes. Away drive the "Dukes," leaving the happy fishermen with cash enough to keep wife and children clothed and fed, and something to put by against the cold winter and herring season. But this picture belongs to the past, not the present. A few disheartened men still try for fish or watch idly from their eerie on the cliffs. The fish never come. "Balaam and Balak Sunday" used to bring the mackerel, but that lesson is read in vain in the parish church now as far as the fish are concerned. "Why,

you see, sir, 'tis this way, they took to draining the town into the river, and the river took the stuff down to the sea, and bless you, sir, the fish they won't come nigh, they keep right away from the place. I often say now 'tis the dumb creeturs that has more sense than we."

On the north-east coast there is a flourishing little seaside town till recently peculiarly adapted for bathing and paddling, the sands and alum scar rocks being flat and even. But now woe betide him who laves in those waters ; they are fouled by sewage, and abscesses in the ear are known to overtake those who attempt to float or gambol in the green waves. Equally unhappy is the luckless one who seeks diversion at low tide on the lovely green ulva-covered rocks that stretch far away into the sea. On close inspection, instead of submarine life, anemone and urdine, they disclose crude sewage, and are fitter hunting grounds for Koch and his cult than the tired holiday-seeker.

We hear the responsible ask sarcastically of the grumbling irresponsible, what is the remedy you propose ?

Fire. Cremate the sewage, and thus cremate the microbe.

On waste marshes at each outfall have large furnaces constructed, heated to a white heat.

Let the effluent waters pass through and boil, and then find their way to the river or sea if need be. The Chinese, who are proverbially unclean and unsanitary in their arrangements, do not suffer from epidemic microbe disease nearly to the extent we do. Why ? They drink tea, never uncooked water—this by the way. To return to sludge—let the latter be hard-baked, dried, and turned out for land dressing. Here the sewage disposal might develop into a flourishing trade. A safer investment for the Main Drainage Committee than nitrates.

A Nebuchadnezzar furnace, with high-blast chimneys, would carry away skyward all unpleasant effluvia.

We have yet to learn that the microbe, though

he can live on the land and thrive in the water, can, salamander-like, survive the fire.

It is written, that the earth is to be purified by fire. Let us commence the purification.

Night and day let the great fires roar and burn up the filth of our cities and leave our rivers to be what they formerly were, the joy of the land.

Cranbrook.

### OLD MEDICAL ANECDOTES.\*

A CURIOUS MISAPPREHENSION.—Among the many whimsical events to which the South Sea speculations gave rise in France, the following odd mistake is recorded. A celebrated physician, named Chirac, was called to attend an invalid lady, just as he had heard the startling news of the further lowering in the price of the much vaunted stock, which he held largely. Full of this subject, he entered the lady's room and, feeling her pulse, muttered to himself, "Ah ! Heavens ! How it sinks ! Down, down, down !" Greatly alarmed at these ominous words, the poor lady screamed out, rang her bell, and summoned all her people about her. "I am a dying woman," she exclaimed, in tears, "the doctor has told me that my pulse is sinking down to an extreme." "Pardon me, madame," said the physician, "I was speaking of the South Sea stock. Your pulse is in an excellent state, and you will be well by to-morrow morning."

ANCIENT ANTIDOTES TO INTEMPERANCE.—An old writer records this fact: "The German mothers, to make their sons fall into dislike for wine, do use, when they are little, to put owls' eggs into a cup of Rhenish, and sometimes a little living eel, which, wriggling in the wine while the child is drinking, so scares him that many come to abhor, and have an antipathy to wine, all their lives after."

INTEMPERANCE IN HIGH LIFE.—The elegant, polished females in the Court of the great

\* Taken from an old French work.

Louis XIV. were far less scrupulous in point of temperance than their descendants. The Duchess of Orleans, in a letter dated May 21st, 1716, wrote: "The Duchess of Bourbon" (daughter of Madame de Montespan) "can drink a vast deal without having her senses disordered. Her daughters wish to follow her example, but they have not heads strong enough to bear so much liquor." The editor of the Duchess's letters remarks that about this period the practice of hard-drinking prevailed to a great extent amongst women of the highest rank and best education.

**PENALTIES ON MEDICAL PRACTITIONERS.**—There was a time when physicians were bound to a strict attention to the welfare of their patients by something besides the consideration of their own credit and profit, for at Dijon, in 1386, a physician was fined by the chief magistrate fifty golden franks (as well as being imprisoned for a time) for not having completed the cures of some persons, whose recovery he had guaranteed. And the beautiful Austrigilda, consort of Gontrau, King of Burgundy, was, in the sixth century, permitted by her husband, in compliance with her dying request, to have her two physicians slain, and buried at the same time as herself. St. Foix, who chronicled this fact, omitted to mention whether this cruel deed occurred by way of punishment for their ill-success, or out of her attachment to them.

**"THE HAIR OF THE DOG THAT BIT THEM."**—The common jocular advice given to persons who are ill from the effects of too much indulgence overnight is "to take a hair of the same dog that bit them," i.e., to take a dose of the same liquor. This saying is probably derived from an absurd mode of treatment recommended for persons who have been bitten by a mad dog, in an old French treatise, entitled "La Médecine aisée," written by the King's physician, and published at Paris in 1719. At page 103, we read "*Pour la cure de la plaie mettez dessus de poil du chien qui là mordu.*"

(For the cure of the wound, put over it some of the hair of the dog that bit the patient.)

**A CLEVER STRATAGEM.**—Jacques Coetier, a physician, was the only person who could keep in awe the irritable, superstitious Louis IX. of France. He governed him by playing upon that king's extraordinary dread of death, which was so marked that he once actually stopped a priest who, after having prayed for the health of his body, was beginning to implore Heaven for his future welfare. "Hold! hold!" cried the king, "you have gone far enough for this time. Never be tiresome in your addresses to the Almighty. Stop now, and pray for my soul another time." Coetier, thoroughly acquainted with this weakness on the part of the monarch, used to say to him when he fancied that his influence was waning, "One of these day you will send *me* packing, I suppose, as I have seen you do with others about the Court; but," using a strong oath, "mark my words, if you do, you will not live eight days after it." By the occasional employment of this menace, Coetier not only retained his position, but the pusillanimous king was induced to appease him with great and valuable presents. On the other hand, he certainly paid much attention to the condition of the king's mind, which was often in a state bordering on lunacy. To amuse the king during his long illness, he contrived to have rural dances performed under his royal patient's window; and to make up for the king's inability to enjoy the excitement of the chase, Coetier caused cats and huge rats to be brought, so as to divert his dying patient by the exhibition of combats between these animals.

**THE ITALIAN ABERNETHY.**—Andrea Baccio, a celebrated Florentine physician, was remarkable for the bluntness of his speech. On one occasion, somewhat against his inclination, he was induced to pay a professional visit to a frivolous old lady of quality. After having to

go through a good deal of ceremony, he felt her pulse, and asked her how old she was. She told him "above fourscore." "And how long *would* you live?" said Baccio, letting go of the lady's hand, and making the best of his way out of the house.

**AN ALARMING THREAT.**—"Your unchristian violence against me," said a Huguenot who had been persecuted for preaching, "will cost hundreds of people their lives." This observation got him into trouble, and he was brought before a court of justice, and charged with harbouring the most bloodthirsty designs against his fellow-subjects. "I am perfectly innocent," said he, "of all you lay to my account. My only meaning was that I purposed, as you would not let me act as a minister, to practise as a physician, for which I am unfitted."

**HOW ANTIMONY GOT ITS NAME.**—It is asserted in a French book, entitled "Le Nouveau Cours de Chimie," that the discovery of the medicinal powers of antimony was due to the celebrated Basilius Valentinus, who, finding that it had the property of fattening pigs, tried it (through what connection of ideas it is impossible to say) on an establishment of monks. Unluckily, instead of improving the condition of these holy men, it killed them off by dozens, whence it derived the name of *Anti-moine*. Parcelaus attempted, notwithstanding this misadventure, to bring this mineral into credit, but he, too, failed, and it was not until a much more recent period that its remedial properties were universally admitted.

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#### PURE SPRING WATER SUPPLY FOR LONDON.

OUR readers will doubtless recollect Mr. Jabez Hogg's and other recent articles in HYGIENE, on the present impure water supply of the Metropolis, utterly unworthy of the largest city in the world.

Derived for the most part from polluted river sources, it must always be fraught with

risk to the consumer, and an extensive outbreak of some such epidemic as cholera or typhoid fever in the populous districts near or above the intake of the great water companies which obtain their supply from the Thames would be followed by the most serious consequences as regards the health and lives of the millions of people who have no other water to drink or cook their food with.

From an interesting report lying on our table, drawn up by Mr. Claud Monckton, C.E., it is evident that the substitution of a pure spring water supply for the Thames water now distributed in the metropolis is possible, at a far less price than the enormous amount required for buying up the existing water companies.

As long ago as 1884 Mr. George Webster, of Harefield Grove, Middlesex (near Rickmansworth), convinced that an excellent pure water supply could be obtained in that locality, consulted the well-known engineer, Mr. Edward Easten, C.E., whose opinion coincided with Mr. Webster's views, and Mr. Monckton was subsequently instructed by that gentleman to design and carry into execution the requisite works. The first experiment under Mr. Monckton's directions afforded such abundant proof of the accuracy of the views which had been formed that, with a well of twelve feet diameter, at a depth of only twenty feet, the pump which was used was overcome by the inflow of water, which rose to the ground surface, and has ever since been running to waste in the adjacent Colne river.

About the time of which we are speaking Mr. Webster, seeing the large volume of water that rose from the trial well, determined to embark upon the enterprise of searching for water on a large scale, with the object of ultimately supplying at least a portion of London with pure spring water; with this view he purchased additional property at Rickmansworth, extending nearly across the Colne Valley. Steadily following out his design, the results of his subsequent operations may be summed up

as follows:—From existing wells sunk at various points of the Springwell Estate, Mr. Webster can now produce 10,000,000 gallons of pure spring water available for immediate use every twenty-four hours, and Mr. Monckton gives his assurance that the supply could be doubled, namely, increased to 20,000,000 gallons, a larger amount than the daily delivery of five out of the eight existing companies.

Further, with thorough business foresight, Mr. Webster has secured easements, *i.e.*, the privilege of laying mains through the parishes of Harefield, Ruislip, Northolt, and Greenford, a distance of over ten miles towards London, up to the boundary of Hanwell, which parish is comprised in the Parliamentary area of the Grand Junction Waterworks Company. Mr. Webster offered to supply the pure water from Springfield to that Company, but they declined to take it, on the ground that they did not possess the necessary statutory powers. There can be no doubt but that such powers could have been readily obtained if the Company had chosen to promote a Bill in Parliament for that purpose; for we cannot think anyone of ordinary intelligence, whether in the House of Commons or outside that assembly, would for a single moment condemn people to consume such unwholesome stuff as that graphically described in Mr. Hogg's article, "Is Thames water fit for drinking purposes?" (HYGIENE, April, 1891), when pure spring water was readily obtainable at a moderate cost. The daily delivery of Thames water, taken at the pumping station near Hampton by the Grand Junction Water Company was, according to Professor Church, between sixteen and seventeen millions of gallons in 1889. With their improved pumping apparatus, and enlarged reservoirs, the Grand Junction Water Company have added to this daily quantity since, but the fact remains that spite of all that has been said in the House of Commons, spite of all that has been written in the Press, the Company continue to serve the

public with Thames water because, forsooth, they do not possess statutory powers enabling them to provide water taken from an absolutely pure source. We leave our readers to form their own opinion of this excuse. *Qui s'excuse, s'accuse*, and this excuse—we will not say, reason—will not be lost sight of when the great water companies formulate their claims for compensation.

Meanwhile, the fact remains patent that a daily supply of 20,000,000 gallons of pure spring water, equivalent to nearly an eighth part of the actual metropolitan consumption, is cut off from London because none of the Thames water supply companies have the public spirit, the courage, or the common sense to substitute pure spring water for that of always doubtful and not unfrequently dangerous quality.

Mr. Webster is deserving of the highest praise for the manner in which he has devoted his capital, his time, and his energies to demonstrating beyond power of contradiction that Londoners might drink pure spring water, instead of polluted river water, if only monopoly and vested interests were treated as less sacred. The "Springwell," near Rickmansworth is but one of many "Springwells" which would be developed within convenient reach of London if a sufficient inducement were held out.

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#### A CERTAIN CURE FOR CROUP.

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By DR. G. H. L. RICKARDS, late One of H. M. Inspectors of Factories.

NEARLY forty years ago, and eight years before I gave up active practice, I was sent for about 9 a.m. to see the wife of a respectable working man, about twenty-three years of age and within six weeks of her first confinement.

I found her suffering from an acute attack of severe laryngeal croup, exactly the same as I had always seen in children. The loud noise attending each inspiration, and so peculiar to croup that when once heard it is never forgotten, was

painfully present, giving rise to a distressing sensation of suffocation. As this symptom had existed since the previous evening I treated the case as actively as I dared to do, and in accordance with the usual practice of that day leeches were applied to the throat, small doses of calomel and opium were given, and salines with antimonial wine. On seeing her in the evening I found her no better; a small blister was applied over the trachea. On the following day I found all the distressing symptoms more aggravated, especially at every inspiration; the blister had given no relief, nor had the medicine. I saw her again in the evening, and the patient was still no better; the breathing was, if possible, much worse. Next morning the larynx was almost blocked up by false membrane, and the brain was evidently becoming poisoned by the impure condition of the blood.

The idea having flashed across my mind to try the effect of applying a solution of nitrate of silver to the larynx, I fully explained to the husband that I had never tried it myself or ever heard that it had been tried by anyone else in croup, but that, considering the very desperate condition the patient was in, I thought it held out a shade of a chance. He at once readily agreed to have anything done that I approved of.

I therefore got a piece of stiff wire about six inches long. I tied a bit of lint round the end, leaving about an inch projecting beyond the wire. I put about 40 grains of nitrate of silver into about an ounce and a half of water; by the time I got to the patient's house it was dissolved. Having obtained the patient's approval I applied this solution to the larynx as far as I could see and reach, and in three minutes I had the inexpressible satisfaction of seeing the patient cough up a complete cast of dense, false membrane, of the whole length of the trachea and quite two inches in width; the upper part of this false membrane next the larynx was at least one-eighth of an inch thick, and cut exactly like leather soaked in water. I need

scarcely say that from that moment the patient's life was saved. She required no further treatment, and in three or four days was quite well.

The next case I saw was that of a baby under a year old. I could hear the croupy breathing as I stood for a moment at the door before entering the cottage. Knowing that I was going to see a case of croup, I went prepared with a small probang and a solution of nitrate of silver, fifteen grains to the ounce. In ten minutes after the application of this solution, I could only hear the croupy breathing by putting my ear close to the infant's face. Next day it was quite well.

I had two more cases similar in their results, and then I gave up practice on being appointed one of H. M. Inspectors of Factories.

The fifth case occurred nineteen years ago, being my own grandson then over a year old. I applied nitrate of silver solution in the same way as in the other cases, at 11 a.m., and by the evening the croup had gone.

The sixth and last case took place on 25th of March, 1890, in the village where I live. About five o'clock on a Friday, a medical friend called upon me with the father of a child he was attending, and asked me if I could oblige him with a few grains of sulphate of zinc, and I inquired for what purpose he wanted the drug. He replied that a little patient, a boy nearly two years old, had been suffering from croup since the previous Wednesday, and that, as the child could not be got to vomit by the administration of ipecacuanha wine he thought he would try sulphate of zinc; at the same time he expressed the opinion that the boy was so ill that he could hardly be expected to survive till the morning. I then explained to him the treatment which I had found so efficacious in croup. Having to return to his home, eleven miles distant, he said, "Well, I must go by the 5.30 train; will you be so good as to perform the operation for me? Though," added he, "I candidly tell you that I quite expect to find the poor little fellow dead by the morning." On

visiting the patient in accordance with my arrangement, I found him suffering severely from croup, with its peculiar cough and breathing. I applied a solution of nitrate of silver, eighteen grains to the ounce of water, and repeated the application a second time in five minutes afterwards. In twenty minutes there was a very perceptible improvement in the condition of the patient, with a corresponding diminution of the croupy cough and breathing; the patient passed a comfortable night, and in the morning, when my medical friend came over to pay his visit, he was agreeably astonished at finding the child free from croup and, in fact, nearly well.

The Manor House,  
Pool, near Leeds.

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## Reviews and Notices of Books.

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*Oysters and All About Them.* By DR. J. R.

PHILPOTS. 2 vols. Pp. 1,370. Published by JOHN RICHARDSON AND CO., 6, Great Russell Street, W.C., and 10, Friar Lane, Leicester.

OUR readers will remember that our November number contained a lengthy article on Oysters, in which the writer mentioned a forthcoming work on that subject by Dr. J. R. Philpots, of Parkstone. The publication of that huge treatise has been delayed for many months; in part, we presume, because reading the proofs was more tedious than was expected, while the author found that the material he was accumulating required more time for its arrangement than he had been prepared for; moreover, the glossary, or index, of 100 pages was another herculean task, which, we are informed, delayed the issue of the work two full months, but at last, after many vicissitudes and delays, the great work is out, and Dr. Philpots has the enviable distinction of bringing out a first edition of his treatise,

and of giving in that first issue as much matter as would make five ordinary works. Usually an author begins with a little book and a low price, and in the course of years, sometimes of half a lifetime, he follows his first venture up with other editions, adding, as new light visits him, a few chapters here and there. Perhaps the prudent and experienced author prefers this method; he can then profit by the hints of reviewers and friends, and turn to account the fresh information which from year to year he accumulates. Dr. Philpots has made such a course practically impossible; his industry is surely not inexhaustible, and he cannot possibly bring out hereafter a second edition in three or four huge volumes. He has already almost exceeded the limits such a work should ever outrun, so that we must regard the present issue as final and as the *magnum opus* of the author's life. The comprehensive title, "Oysters, and All About Them," we frankly confess, disarms opposition and silences criticism; but we are afraid that the enormous amount of material in these volumes will frighten readers. The great thing in literature is compression and brevity; long reports seldom get read. Should the work be generally read, we are sure that the readers will learn a great deal, and we are fully prepared to admit that members of Parliament, oyster enthusiasts, owners of foreshores, and persons specially interested in the subject will find it valuable as a book of reference; still we do not anticipate a large sale, although we believe that had the author not exceeded 500 or 600 pages he would have had ten times as many readers. Fortunately, Dr. J. R. Philpots is not a professional writer, and will not complain should comparatively few copies be applied for.

We must congratulate the publisher on the get up and appearance of the work. The paper is clear, thick, and excellent, and the printing very good, while the learned and accomplished clergyman, the Rev. R. A. Chudleigh, of West Parley Rectory, Wimborne, who, from disinterested friendship, has read the proofs, deserves no small

praise. Mr. Chudleigh is in no sense responsible for any statement in the treatise; the compilation of the book is the author's own work alone. Mr. Chudleigh simply read the proofs, here and there making a suggestion, correcting a date or verifying a quotation, and all this he has done so excellently that he might easily get a living as a "reader" of scientific and classical works, while we have no doubt that his ripe scholarship and patient, untiring care admirably fit him to edit works of far greater pretension and difficulty than the present.

As we so recently reviewed the book, we cannot with justice go over the ground again, although we may say that Dr. Philpots has given long chapters to oyster culture in France, Germany, Italy, America, Holland, and England. There are exhaustive tables of statistics, as well as a summary of the legislation relating to oysters, and one chapter—*Curiosities of Oysters*, to which most readers will at once turn—gives a good many lively anecdotes. Moreover, the history of the oyster, its reproduction, anatomical structure, and habits, are fully dealt with, and do credit to the writer's love of his subject.

But Dr. Philpots has practical aims in view. He wants to give a stimulus to artificial oyster production, and to open up an industry that will provide constant employment for thousands of hands, and make oysters more plentiful than they have been for many years. The past disastrous winter must, however, we fear, have dealt a severe blow to all British oyster companies; the destruction of oysters was prodigious, and we are informed that a single company lost a sum so enormous that we hardly dare to mention it, while losses of from one to three thousand pounds were common enough. Professor Huxley, to whom the present work is, by permission, dedicated, is not hopeful of the future of oyster culture, and warns his readers that some time ago, when the matter was prominently before the country, vast sums were lost

and failure was everywhere the order of the day. We want surer and much cheaper methods than any yet laid before us; we want to know how we can, with almost absolute certainty, rear and protect the young oyster, so that we can supply the market at cheap rates. Is such a thing practicable? We greatly fear not; at any rate we do not think that any real progress has been made so far, and the spat and the baby bivalve are still the prey of countless enemies, and liable to be killed off by every spell of sharp frost, and in this way the labour of years may be sacrificed in a few hours.

Once more we congratulate Dr. Philpots on this great work, which at the end of six years' labour he has just brought out, complete to the last line. Such labour as his, coupled with the necessary expenditure accompanying it, might in another walk of literature have brought out a work which would have rewarded him with fame, and that more solid proof of popular estimation which helps to increase one's balance at the bankers; but works appealing to a small class must be in the main labours of love, and a heavy expense to the writer. Still in this wealthy and highly cultured country of ours, there ought to be some demand, and the libraries should not be slow in ordering copies. The subject is not without interest, and probably the English language cannot boast of another treatise on oysters so full, comprehensive, and carefully put together, and the author must find his highest reward in the consciousness that he has done his self appointed work to the best of his ability, and regardless of cost and trouble.

S. U. M.

#### CHILD WORK IN FACTORIES.

At the Berlin Conference on the Labour Question it was unanimously agreed by the delegates from various European countries to fix twelve years as the minimum age at which children should be allowed to work in factories.

So strongly, indeed, did all the delegates, except those from England, feel upon this matter that the British representatives, who were opposed to the others on this point, found that their influence in the Conference would be very seriously impaired if they refused to come into line with the Continental delegates. The consequence was that they fell in with the views of the majority, and that in the final protocol it stood recorded that Great Britain gave its support to the proposition that it was expedient to exclude from factory work all children of either sex who had not attained the age of twelve years.

But when the Factories and Workshops Bill was brought before the Grand Committee of the House of Commons, the advocates of a retrograde policy succeeded in so framing the Bill as to make it contrary, in respect of child labour, to the principles accepted at Berlin—a most unwise and improper thing to do, as constituting virtually a breach of international obligations, apart from other objections that might be raised.

Accordingly, upon the Bill, as amended by the Grand Committee, being considered by the House on June 18th, Mr. Sydney Buxton moved to insert a clause enacting that after January 1st, 1893, no child under eleven years of age should be employed in a factory or workshop. A long and interesting debate ensued, the result being that the Government were defeated, and Mr. Buxton's resolution was carried by 202 votes against 186.

Although the age thus fixed is too low, still the carrying of Mr. Buxton's motion is an encouraging step in the right direction, and we may hope for further protection for factory children at no distant date. Unfortunately we cannot expect the present Government to do anything towards bringing about this desiderated end, for notwithstanding their defeat on June 18th, they gave such strenuous opposition on the following night to two amendments, one prohibiting the employment of children under twelve years of

age, commencing from the 1st of July, 1894 and the other prohibiting the full-time employment in a factory or workshop of a child of fourteen not having obtained an educational certificate, that the first amendment was withdrawn, and the second rejected by 189 votes against 164.

England, presumed to take the lead in progress and humanity, is far behind other countries as regards this matter. France some time ago enacted a measure which fixed the age at which children should be allowed to commence factory work at thirteen years; in Austria and Switzerland such employment is prohibited until the age of fourteen; while in Germany the limitation is thirteen years.

The number of children affected by Mr. Buxton's successful amendment fixing the age at eleven years, is estimated at 60,000, of whom 40,000 are in the two counties of Lancashire and Yorkshire. Everyone who read the article on the condition of factory children, contributed by Dr. J. S. Torrop, certifying factory surgeon, to the May number of *HYGIENE*, in which that gentleman described the stunted growth, the cheeked physical development and wan looks of these poor little creatures, cannot fail to sympathise with the efforts made for their amelioration.

### EARLY RISING.

“WHOEVER has tasted the breath of the morning knows that the most invigorating and most delightful hours of the day are commonly spent in bed, though it is the evident intention of Nature that we should enjoy and profit thereby. Children awake early, and would be up and stirring long before the arrangements of the family permit them to use their limbs. We are thus broken in from childhood to an injurious habit; that habit might be shaken off with more ease than it was first imposed. We rise with the sun at Christmas; it were but continuing to do so till the middle of April and,

without any perceptible change, we should find ourselves then rising at five o'clock, at which hour we might continue till September, and then accommodate ourselves again to the change of season."—*Southey*.

We fear that those of our readers who stand in need of friendly admonition and advice on this point will forget all about their good resolutions if they wait six months before beginning to put them into practice, and we would recommend an earlier start on the way to early rising.

A good plan would be to make a point of getting up ten minutes sooner every day for, say, a fortnight. By the end of that period they would find themselves, just as Southey says, without any perceptible change in their arrangements, rising more than two hours earlier than was their previous custom. And what is the real significance of two hours' earlier rising? Why, that in a single year there is a gain equivalent to seventy-three working days of ten hours each. Carrying this calculation still further, it follows that a person who habitually rises two hours sooner than another would in fifty years gain the advantage over the other of ten years' time, each year comprising three hundred and sixty-five days of ten hours, taken from the best part of the day.

We fancy that we hear some of our readers exclaiming that they cannot get up, and that, though they do go to sleep again, even after that they do not feel sufficiently rested. On this point we would quote one of the most sensible medical authorities that ever lived, John Abernethy: "I always," he wrote in his "Observations," "caution patients against sleeping too much; waking from sleep indicates that the bodily powers are refreshed; many persons upon first waking feel alert and disposed to rise, when upon taking a second sleep they become lethargic, can scarcely be awakened, and feel oppressed and indisposed to exertion for some time after they have risen."

The beneficial effects of early rising upon the

general health must not be lost sight of. Increased physical and mental vigour, better powers of digestion, and a clearer eye, all bear constant testimony to the advantages of early rising, bringing in its train, as it must necessarily do, early hours of retiring to rest.

Early to bed and early to rise  
Make a man healthy, wealthy, and wise,

is an axiom which is not destined to drop into the limbo of fallacious proverbs.

## Notes and News.

UNFAIR POSTAL CHARGES.—In our April issue we spoke of the inequitable manner in which postal charges on periodicals are made. Take the case of HYGIENE for instance. Because it is published monthly, instead of weekly, and because it does not contain a certain proportion of so-called news, a heavy tax is imposed, when one considers the many thousands of copies sent by post in the course of the year. HYGIENE cannot be sent under 1d, while any registered weekly newspaper can be transmitted—without regard to weight—for  $\frac{1}{2}$ d. When, therefore, we send out, say 20,000 copies, we are charged 20,000 halfpennies more than ought to be the case, and this sum means £41 13s. 4d. in excess of the charge that would be made if the Post-office authorities allowed us fair play. An important deputation, representing a very large number of periodicals suffering, like HYGIENE, from unequal postal regulations, had an interview with the Postmaster-General at the House of Commons, on June 23rd, to state their grievances. The indefatigable postal reformer, Mr. Henniker Heaton, introduced the deputation, and in his speech specially alluded to HYGIENE. He remarked that a registered weekly publication, constituting a newspaper, by reason of its containing details of some horrible murder, minute particulars of some unsavoury divorce case, statements of the ravages of influenza in various districts, and so on, would be permitted to pass anywhere in the kingdom for a halfpenny. But, added he, take the case of a monthly periodical of scientific character, of great public utility, which, instead of merely informing its readers of the prevalence of an epidemic and of the alarming mortality from it, instructs its readers how to ward off its attacks, and how to treat it, and the postal authorities at once impose a higher rate of postage. The principle is wrong, is opposed to every notion of fairness, and absolutely indefensible. The Bill now before Parliament, introduced by the Postmaster-General, affords an excellent opportunity for rectifying this and other similarly objectionable regulations, both in the public

interest and in fairness to those who endeavour to promote the public good.

**OPIUM.**—Some idea of the universality of the use of opium in the central parts of China may be derived from the fact that it is made a medium of exchange, owing to its being in such general demand. Further, opium is light and portable, and capable of small subdivision.

**HOW TO MEASURE SUNSHINE.**—Stokes' "Sunshine Recorder," the best apparatus used, is in the form of a sphere of glass, adjusted in such a manner as to accommodate itself to the varying position of the sun; a burning glass, in fact. The heat which is thus concentrated falls on a card, upon which hours and quarters are printed, and the cardboard becomes scorched at the focal point. By looking afterwards at the burnt card, bearing on its face the hours and quarters, it will be at once seen when and for how long the sun has been shining.

**THE INSANITARY CONDITION OF THE HOUSES OF PARLIAMENT** has long been a theme of discussion and the extraordinary prevalence of influenza amongst members, and others whose duties have necessitated their attendance there, has drawn fresh attention to this matter. When the old Houses of Parliament were burned down in 1834, it was proposed to erect the new buildings on a fresh site, further away from the river, then in a more insanitary state than now, but the proposal was overruled, partly on sentimental and partly on aesthetic grounds. Despite the comparative purification of the Thames since then, frequent evidences of unhealthiness arise, due, we believe, more to the circumstance that the drainage arrangements of the two houses lie low than to any other reason.

**OYSTERS.**—It has now been definitely ascertained that the damage sustained by the oyster beds at Whitstable during the great frost of 1890-1891 was upwards of £30,000. The "natives," lying deepest in the water, were less injured than the "seconds" quality, already almost out of supply. Oysters of this class are imported when young and must be kept in the English beds for two years or more before they are fit for use. With a view to partially repairing the damage done, two million young oysters have been laid down.

**THE WATER SUPPLY OF BIRMINGHAM** will probably be strengthened by obtaining an additional supply from the water sheds of the rivers Elan and Claeraven in Radnorshire, as a scheme for this purpose has been unanimously approved by the Birmingham City Council. The expenditure on reservoirs and pipes is estimated.

at four million pounds. At present the town is supplied partly from local streams and partly from local wells sunk in the red sandstone, and as the former are exposed to increasing risk of pollution, and the supply from the latter has been pushed to its full extent, it is requisite to go further afield. Birmingham has been for many years a model town in the management of municipal affairs, such as water supply, lighting, etc. Speaking of Birmingham in this connection, we wonder how many of our readers remember the town in the middle of the present century when the cry of "fine Digbeth water," uttered by itinerant vendors, traversing the back streets with their water carts, was a common sound.

**THE EXPLOSIVES ACTS.**—The advantage of efficient inspection is shown by the fact that the Government Inspector of Explosives is able to state in his recently published fifteenth annual report that the number of deaths by accident amongst more than 10,000 persons engaged in the manufacture of explosives amounted to eight only. For the seven years previous to the Explosives Acts coming into operation the deaths from accident in this branch of industry averaged thirty-nine annually, although the number of persons employed was considerably less than it now is.

**VEGETABLE BITTERS AND TONICS** are much more used in the United States than on this side of the Atlantic, although their consumption here has greatly increased during the last few years. Out of 47 different bitters which were submitted to examination by the official analyst to the Massachusetts Board of Health, 46 contained alcohol, notwithstanding the fact that its alleged absence was, in many cases, advanced as a reason why teetotallers should have recourse to these drinks. One of them, described as a purely vegetable extract, "a stimulus to the body without intoxication" showed, on analysis, 41·6 per cent. of alcohol, and two "stomach-bitters" contained respectively 42·6 and 44·3 per cent. of alcohol. The particular tonic which had 41·6 per cent. alcoholic strength was specially recommended by its vendors for inebriates struggling to reform, because "its tonic and sustaining influence on the nervous system is a great help to their efforts." The bearing of these analyses may be easily imagined when it is considered that sherry has only from 18 to 20 per cent. of alcohol in its composition.

**THE BLESSING OF HEALTH.**—"O blessed health! thou art above all gold and treasure! 'tis thou who enlargest the soul and openest all its powers to receive instruction and to relish virtue. He that has thee has little more to wish for; and he that is so wretched as to want thee wants everything with thee."—*Sterne*.

# HYGIENE,

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## CREMATION.

A FEW weeks ago we were taking an afternoon stroll along one of the many pleasant country lanes in Surrey, hardly known to Londoners, although within half-an-hour's ride by rail from Waterloo, when the fancy took us to turn out of the road along a footpath leading through the fields in the direction of the little village of Morden. The day, though warm, had not been sultry—Nature was at her best, even for June; and as we wandered along, thoroughly enjoying the calmness of the scene, the quiet being broken only by the occasional rushing of our dogs into the waving grass in vain pursuit of some real or imaginary object, and by the melodious strains of song warbled by the feathered survivors of the cruel, long frost of 1890-91, we contemplatively puffed away at our meerschaum, and felt at peace with all men, forgetting, too, for the moment, that within a mile of the fields we were traversing the railway company had, some fourteen months previously, nearly succeeded in knocking our head off our devoted \* shoulders, by the exceedingly simple, though highly dangerous, process of dashing a heavily laden goods train against a passenger train (in which we were travelling) rendered stationary by reason of its engine having gone off the rails.

But, suddenly, a sharp reconnoitring bark from our little terrier, known as Thistle (partly because the mother's name was Nettle, and partly because "*Nemo me impune lacessit*" is the *motif*, as they say in music-parlance, of Thistle's life), aroused our attention, and caused us to become conscious of the distant hum of voices and sound of busy work, as if some human hive had been magically awakened into activity in this still retreat. As we hastened forward we came upon groups of men, some digging trenches and throwing up earth mounds as only British navvies can, others carting the earth away, others, again, erecting large brick buildings; all so energetically employed that we almost began to despair of finding any one sufficiently at leisure to give us any information. Just then we caught sight, some little way off, of an old fellow, whose manner, as he idly reclined his yet stalwart form against the trunk of a venerable elm, clearly indicated that though worn with work, he was filling in the interval between adolescent life and senile decay by earning his subsistence as a caretaker. To him we promptly directed our steps, and by a little questioning, aided by the largess of "the price of a pint," so favourite and potent an incentive to the rustic mind, we ascertained the nature of the operations going on around us. "Why, Lord bless you," he

\* DEVOTED, *strongly attached*; see Nuttall's Dictionary.

ejaculated, with a look of profound wonderment at our ignorance, "don't you know that this is going to be the Battersea new burying-ground? what you gentlefolk" (the price of a pint was beginning to work) "call a cemetery." He did not quite say "cemetery," for he had been born many years before school boards vexed the souls alike of village parsons and hob-nailed "crow-tenders" (one of the latter of whom he had doubtless been in his boyhood days), but we caught his meaning. As he continued, warming to his subject, with an appreciative glance now and then at Thistle, who, convinced that we had not fallen amongst foes, lay near our feet, blinking lazily at the rays of the setting sun, we gathered from him that the great metropolitan parish of Battersea had acquired possession of an estate of one hundred and thirteen acres, and that the ground was being rapidly prepared for the interment of any of the hundreds of thousands of parishioners who might be brought thither, as their last home. With a sly look at our damaged frame, which has not fully recovered from the shock of the railway accident already alluded to, the old fellow wound up his narrative with the observation, "But they ain't strict on that score, for they would take you or any other stranger to the parish for a bit extra." His dull grey eyes twinkled as he said this; whether in consequence of the obvious wince we involuntarily made at the old man's shrewdness in detecting a likely candidate for the Battersea burying-ground, or through calculating the "extra bit" which would devolve to the parish, we did not stay to determine.

As we concluded our walk, not altogether enlivened by our unexpected discovery, our thoughts naturally turned to the various modes of disposal of the human dead. "The worst use you can put a living man to is to hang him," was the remark once made by an eminent opponent of capital punishment. We would venture to paraphrase this opinion by saying, "The worst use you can put a dead man to is

to bury him." London alone furnishes a death-roll of more than one hundred thousand persons annually. The total period occupied in the decomposition and destruction of a human body disposed of in the ordinary way is twenty or thirty years. Imagine the horrible condition of things, the danger involved to the living, by the slow putrefaction of, say ten years' London dead, or a million bodies in various stages of decay, and disintegration into noisome gases; poisoning the water that the survivors drink, the very air that they breathe. "Imperial Cæsar, dead and turned to clay, May stop a hole to keep the wind away," but before arriving at this degree of usefulness every corpse, be it that of an Emperor or a camp-follower, must go through many years of slowly rotting away.

One hundred and thirteen acres taken for ever from useful agricultural or horticultural purposes, and dedicated to the gruesome functions of the charnel house! And this, too, be it remembered, for a single metropolitan parish. Some years ago, the late Bishop of Manchester, having occasion to consecrate a cemetery, observed, "Here are one hundred more acres of land withdrawn from the food-producing area of this country for ever. Cemeteries are becoming not only a difficulty, an expense, and an inconvenience, but an actual danger. I hold that the earth was made, not for the dead, but for the living. No intelligent faith can suppose that any Christian doctrine is affected by the manner in which, or the time in which, this mortal body of ours crumbles into dust and sees corruption."

The opposition to the universal adoption of cremation as the means of disposing of the dead is based upon three sets of objections, namely, religious, sentimental, and legal.

We need not spend much time in discussing the first-named, as the quotations which we have made from the late Bishop of Manchester's speech, to our mind, effectually dispose of the religious arguments against cremation. There are a certain number of people who still believe

in ghosts, which they invariably clothe in their imaginative descriptions after the fashion of the deceased—in armour, periwigs, ruffles, blue coats with brass buttons, black satin dresses, mob-caps, &c., according to the period in which the dead person, who descends to put in a ghostly appearance, flourished. “In the same figure, like the king that’s dead,” says Bernardo, in *Hamlet*, when the apparition of the murdered sovereign presents itself to his affrighted gaze and that of his comrades. “Such was the very armour he had on, When he the ambitious Norway combated,” adds Horatio, as another circumstantial clincher; and all the three comrades promptly arrive at the conclusion that the spectre of Hamlet’s father has passed before them. Such narratives suited the superstitious minds of Shakespeare’s time, and afforded excellent opportunities for the display of his marvellous dramatic powers; but the number of persons at the present day, outside the walls of a lunatic asylum, who implicitly believe in the possible existence of ghosts of former living beings—not to mention the ghosts of armour, clothing, walking-sticks, etc.—must, indeed be small. Equally limited, too, in number, must be those persons whose religious doctrines are of such a material character that they put credence in the notion that the dead will rise again in the same condition as that in which they were during their lifetime.

The sentimental objections to cremation are mainly due either to ignorance of facts, or to that apathetic indifference which leads people to blindly accept the statements of others, without any endeavour on their own part to ascertain the correctness of such statements. Anyone who has had an opportunity of witnessing the orderly, decorous, and reverent manner in which cremations are carried out at Woking, under the regulations of the Cremation Society, would admit that all arguments on the ground of sentimentality are cut completely away. A process by which the

“corruptible body,” spoken of in the Burial Service, is, within the space of about an hour, rendered absolutely innocuous, both the corpse and the light shell in which it was enclosed being at the end of that time converted into five or six pounds of pure white ashes, must, even on the narrow ground of sentimentality, be preferable to that of enclosing the body in a coffin and then abandoning it to undergo slow decomposition. When the crematory process is ended, these ashes are collected, and can be either deposited in the ground, where they take up little room, can do no harm, and soon become incorporated with the earth, or they can be preserved in urns placed in niches, with suitable inscriptions. As indicating the progress which cremation is making in Germany, we may mention that last year the Urn Hall, erected by the Berlin Cremation Society in the Friedrichsfeld parish churchyard, to receive the ashes of the dead without distinction of sect, was consecrated in the presence of representatives of the municipal authorities.

At first sight, the legal difficulties in the way of the universal adoption of cremation seem of a more serious character than those which have been already adverted to. But these, too, will melt away if regarded and treated from a practical point of view. It has been urged that the destruction of bodies, so soon after death, will open the door to an increase in the number of cases of criminal poisoning, in consequence of the greater immunity from detection. At present, if suspicions should arise of foul play, an order can be obtained from the Home Office, authorising the exhumation and examination of the body. But, as a matter of fact, exhumation is exceedingly rare, as shown by a return which was procured, at the instance of Sir Henry Thompson, by Dr. Danford Thomas, Coroner for central Middlesex, from 317 out of the 334 coroners in England and Wales, including all of the most important districts. The object of the inquiry was to ascertain the number of exhumations made during the previous twenty years.

In all, they amounted to only 102; from which data it may be estimated that the annual number throughout England and Wales was only 5. The verdicts returned by the juries at the inquests held in these 102 cases were as follow:—Natural causes, 57; accidental causes, 20 (these and the foregoing constituting three-fourths of the total of exhumations); murder, 13; manslaughter, 4; and open verdicts, 8. Very few of the cases where death was traced to criminal causes were due to poisoning. The protection against criminal poisoning afforded by the facility for exhumation, of which the opponents of cremation make so much, is therefore considerably overrated.

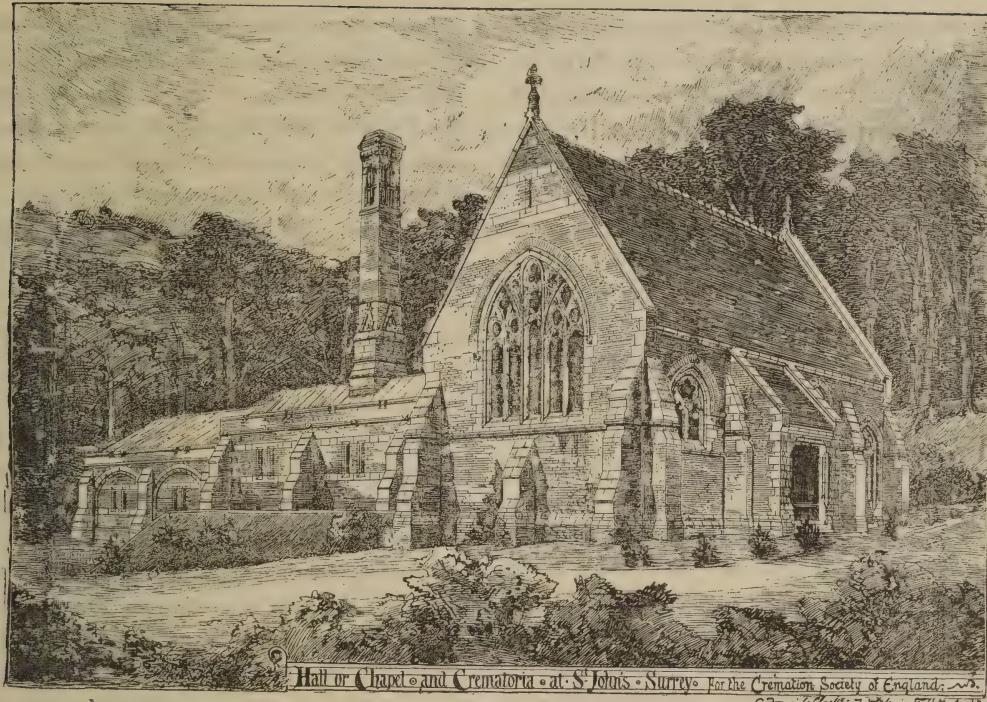
Moreover, although people talk glibly of the advantages which exhumation presents, in facilitating the detection of crime, they appear to forget that all traces of poison are rapidly removed after the body has been placed in the earth, and that, as a result, the chance of finding the poison, even a short time after burial, is small. This is especially the case with the powerful vegetable alkaloids, such as morphia, atropine, &c., which undergo rapid change. In fact, the only poisons which can be with any degree of certainty traced by post-mortem examination after exhumation are the three metallic ones, arsenic, mercury, and antimony.

But, as Sir Henry Thompson pertinently puts it in his book on "Modern Cremation," "exhumation is at the best a clumsy effort to rectify culpable want of care before burial." Many thousands of bodies are actually allowed to be interred in this country without any medical certificate being previously demanded, amounting in one year, of which Sir Henry gives the statistics, to 3·5 per cent. (35 in every 1,000) of the total number of burials. The time at which the cause of death should be definitely and positively determined is as soon after death as possible. Our system of inquiry into the causes of death is inferior to that of France, Germany, and other European coun-

tries, where the dead body is examined by a medical officer specially appointed to that duty, known as the *médecin vérificateur*. When a death is reported in Paris, the civil officer communicates with the *médecin vérificateur* of the district, and awaits his report to decide, in concert with the deceased's relatives, at what time the burial shall take place. The medical officer visits, without delay, the address given to him, and makes a written report, in which he details all the ascertainable necessary facts relative to the death, obtained by inquiry, as well as those which result from the examination of the body, in accordance with the schedule used on such occasions.\* This officer (who has, of course, had no professional relation with the deceased) states in his report the name and address of the doctor who attended the deceased, of the chemist who supplied the medicines prescribed, and of the nurses, if any were employed. He further records the hygienic condition of the house, and other circumstances. Until this inquiry has been completed, the facts recorded, and official permission granted, no interment is allowed to take place. A proper inquiry of this description leaves no means untried of determining the cause of death. If such a system were adopted in this country, the last argument against cremation would be swept away.

It would be obviously unfair to hold cremationists responsible for any shortcomings in our system of registration of causes of death; but it may here be mentioned that the Cremation Society of England does its best to remedy these by the exercise of strictness in the conditions to be complied with before the use of the Woking Crematorium is granted. The society does not permit the cremation of the body of anyone who has not, during his lifetime, or by will, expressed a desire to be cremated after death; and instead of only the usual certificate of cause of death from one medical man, a second special certificate from another qualified practitioner is

\* A complete copy of the French schedule will be found in Sir Henry Thompson's work,



required. Further, if no doctor has attended the deceased, the society insists upon the cause of death being ascertained by a *post-mortem* examination conducted by a medical officer appointed by the society, unless a coroner's inquest has been held, and a satisfactory verdict has been returned. It will thus be seen that there is actually less risk of crime going undetected in a case of death, where the body is subsequently cremated, than when it is buried.

The cost of cremation is a subject on which much misconception exists; for it is commonly supposed to be very high, though such is not the fact. At the Woking Crematorium the total expenses, including the charge for the use of the crematorium, the fees of the attendants, and all other items connected with the ceremony, are fixed at £6. The cost would be diminished if the crematory were more used, as the amount of labour and outlay involved in a single cremation would be triflingly increased if

the process were repeated for several other cremations.

The progress which cremation has made in England is slow, but steady, like that of all innovations — however excellent — introduced into a country where new ideas are regarded with suspicion and prejudice. Twenty years ago, only, no attention had been given to the practical application of a system of disposing of the dead which was held in favour by the ancients. Its modern use was first broached in Italy, where it has gained rapidly in public estimation. The first Italian crematorium was erected at Milan in 1874, and a considerable number of bodies have since been cremated there; in addition to which, more than forty communes have provided crematories for the use of their inhabitants.

France, Germany, Austria, and the United States have been less slow, too, than England in adopting this method. More than 500 bodies were cremated in the first eight months at the

crematorium built in the cemetery of Père-la-Chaise by the Municipal Council of Paris.

In this country, chiefly in consequence of Sir Henry Thompson's advocacy through the press, an association, called the "Cremation Society of England" was established in 1874, for the purpose of making known the principles and advantages, and promoting the practice, of cremation. Its members have not attempted to force public opinion; on the other hand, they have merely sought to gradually lead it. The opposition which the supporters of cremation had to encounter has been enormous. In 1884, Mr. Justice Stephen greatly strengthened the legal status of the society by delivering judgment in a Welsh case to the effect that cremation was perfectly legal provided that it was effected without causing a nuisance. Shortly after this decision, the subject of cremation was brought before the House of Commons by Dr. Cameron, M.P. for Glasgow, who introduced a bill "to provide for the regulation of cremation and other modes of disposal of the dead." Dr. Farquharson, M.P. for Aberdeen, and Sir Lyon Playfair, M.P. for the Edinburgh and St. Andrew's Universities, ably and eloquently supported the bill; and, although the Government gave it most strenuous opposition, 79 members voted in favour of it in the division on the second reading, while there were 149 votes against it. The public mind has since been so much more enlightened on the subject that there would be little doubt as to the result of a division whenever a similar bill is again introduced.

The Woking crematorium\* was used for the first time on March 20th, 1885, and up to the end of 1887 twenty-six bodies were cremated; in 1888 twenty-seven cremations took place; in 1889, forty-six; and the total number up to the present date is about two hundred. During the past twelve months, several well-known

persons have been cremated at Woking; amongst them, Baron Huddleston, Mr. Kinglake, the historian of the Crimean Campaign, the Duke of Bedford, and Mr. James Beal, for many years prominent in all movements having London municipal reform for their object.

W. A.

## WATER FOR TOWNS.

### CONSTANT SUPPLY VERSUS INTERMITTENT.

WE need not enter upon any lengthy disquisition on the part which Water plays throughout Nature. One of the four elements recognised at an early period by ancient writers, it enters into the composition of most terrestrial substances, whether organic or inorganic; while forming, as it does, according to the researches of Chevreuil, about two-thirds of the entire weight of the human body, it is absolutely necessary for carrying on the chemico-vital operations of the living system.

What we have to deal with here is water—"honest water," as Shakespeare wrote—regarded in its sanitary relations. Its value, in this respect, is so universally admitted, that we need not dwell upon it. The question before us resolves itself, therefore, into the simple inquiry—How should water be supplied to the inhabitants of towns, who, owing to local circumstances, must derive their supply from a more or less distant source, through service pipes? The answer which would be given by everyone who has devoted attention to this subject is, that the supply should be *constant*; and that it is not invariably so is attributable, in part, to the ignorance, apathy, or powerlessness of the consumers, and, in part, to the sordid, selfish policy shown by water companies generally.

The Reports of the House of Commons' Committees upon Water Supply, and of the Royal Sanitary Commission, have demonstrated, in language more forcible than is commonly to be found in such documents, that in many parts of London, especially in the poorest and most

\* We are indebted to the courtesy of Sir Henry Thompson for the illustration of the chapel and crematorium erected at Woking Cemetery, by the Cremation Society of England.

densely inhabited districts, the quantity and quality of the water supplied were far from being what they ought to be; and it not unfrequently happens during the summer months, when there is greatest danger of some epidemic breaking out, many thousands of persons are kept for weeks in a disgracefully deficient condition, almost amounting to a water-famine.

The quantity of water supplied for each individual in a community necessarily varies according to locality and other circumstances. In villages the estimated daily quantity is about 10 gallons per head for all purposes; while in towns possessing a good supply, the average reaches as much as 35 to 40 gallons. Returns issued by the Board of Trade show that the water supply of the various towns named in the reports ranged from as low as 12 and 14 gallons per head of the population daily, in Norwich, Derby, and Manchester, to 50 gallons in Glasgow. This city can boast, not only of a larger supply of water, but of a purer (derived from Loch Katrine) than any other populous place in the Kingdom. If we cross the Atlantic, however, we find that our American cousins beat even Glasgow in respect of quantity, the daily supply to New York from the Croton (between 40 and 50 miles away) being estimated at 70 to 90 gallons for each inhabitant of the districts provided with Croton Water. The daily quantity per head in Paris is 30 gallons; London it varies from 35 gallons upwards.

Compared with the average of village water-supply, these figures for towns may, at first sight, appear high; but we fear that to a certain extent they are placed in excess of the actual amount. The reader must also take into consideration the circumstance that large quantities of water are used in towns for manufacturing purposes, which would make the average per head seem much higher than what is really used for domestic purposes; while a much larger quantity of water is necessary in all places where the system of water carriage is resorted to for the removal of sewage-matter

than where such a plan is not employed. The sewers rarely contain more than a few inches of water, and the supply of water, particularly in the poor neighbourhoods, is too often inadequate to the efficient flushing and cleansing of the drains, which consequently become loaded with refuse matter in every stage of decomposition. Hence, it will be seen that no comparison can fairly be instituted between localities which possess no general system of drainage, and where, as a consequence, there is a difficulty in the disposal of surplus water, and towns provided with proper sewers and drains, where any so-called waste water passing into these outlets would, of course, serve a useful function in cleansing them.

Here we come to one of the principal objections urged, from an economical point of view, against the system of constant water supply, namely, that with such an arrangement much water would be wasted, either through neglect or through imperfect fittings. So long as it is left in the hands of commercial companies to provide and make large profits out of one of the greatest necessaries of life, such arguments—based upon false notions of economy—will be brought forward, and will receive the support and approval of a certain section, which regards *£ s. d.* as of more importance than the welfare of the community. It was not so in ancient Rome, whose aqueducts, constructed and maintained at the public expense, still remain to astonish us with their grand proportions. Of late, much has been said and written concerning the desirability of the Government's purchasing the rights of the existing Gas Companies, so as to make the supply of gas a public instead of a private matter, as has been done with advantage in the case of the Post Office Telegraphs. If such measures are advisable with respect to gas—and their advocates show excellent reasons in favour of their views—by how much the more is it necessary that the supply of water should be made a public trust and duty?

But as such a consummation, though "devoutly to be wished for," does not appear to be very close at hand, despite official enquiries and House of Commons Committees, we must be content to deal with the matter as it stands. One great argument used by the defenders of the system of intermittent water supply is, as has already been stated, that under the constant supply system there would be greater liability to waste, through carelessness on the part of the consumers, or through inefficiency of the fittings employed. Facts, however, do not support this assertion; indeed, they go to prove the contrary. We know one large town where the constant supply system has been in full operation for years, and the average quantity used is not much more than one-third, as compared with what was formerly wasted under the intermittent system; and a high authority on the subject, Mr. Michael, in the "Manual of Public Health," urges that a constant high pressure would necessitate a supervision over fittings now greatly wanting, while its omission leads to much leakage and loss of water.

By the use of suitable apparatus, and the introduction of the constant supply system, we should be able to do away altogether with storage cisterns, which are now requisite under the intermittent system. Very few persons, comparatively, whose attention has not been specially directed to this point, have any idea of the abominable extent to which house cisterns become fouled by the deposit of dust, dirt, etc. The Royal Sanitary Commission, reporting on this point, observed:—"In houses of the rich the cisterns are frequently more or less unsatisfactory, perhaps not free from effluvia caused by drainage pipes, whilst in the more confined and less cared-for houses of the lower and working classes, they are often the receptacles of putrid matter." Some few years previously, a Special Committee of the House of Commons, appointed to inquire into the water supply of the East End of London reported that "The

cisterns used for the purpose of storing water for household consumption are probably a more fertile source of impurity than any pollution of the river whence the water is drawn. Decaying animal or vegetable substances, or other impure matters, may easily find their way into a cistern, and are more likely to engender disease than any impurity existing in the water before it flows into the cistern." Of course, if we extend the inquiry further into the evil effects of the intermittent water supply, where no cisterns exist, and poor people are obliged, through the want of adequate storage, to keep water in pails or tubs in their living-rooms, the case becomes still worse; and the more we regard the bad results of storing water in house cisterns or other receptacles, arising out of the intermittent supply system, the more evident is the wisdom of the conclusion at which the Royal Sanitary Commission arrived:—"We think that Parliament should as much as possible, insist on the constant service which the general statutes have enjoined."

Before we leave this point, we may remark that the amount of waste through the overflow pipes of cisterns is very great; so that, if only on economical grounds, it would probably be to the advantage of all Water Companies to do away with storage cisterns, and to adopt the high pressure, constant system.

Besides the certainty of the water becoming deteriorated by being kept in cisterns, there is another danger to health arising from the occasional use of the intermittent system, when the water is delivered by services designed for the constant system. This was first pointed out by Dr. Alfred Carpenter in an article published some years ago. That gentleman showed that there is always risk of sewage contamination where the supply is less than the demand, in this manner. If the pipes pass along through sub-soil contaminated with sewage, and the pipes are, as is often the case, corroded and leaky, when they become partly empty, the pressure from without inwards causes some of the sewage

to be drawn into the defective mains, and thus to become admixed with the pure water supplied from the works. In the same article, Dr. Carpenter states, as we have already observed, that the consumption of water in towns varies more in accordance with the quality of the fittings employed than with the quantity of water required. For instance, at Croydon, it was found that the water supply amounted to 56 gallons per head daily. At Dr. Carpenter's suggestion, the Local Board of Health instituted an inquiry through their engineer, Mr. Baldwin Latham, and it was proved, by actual experiment, that in those districts where the requirements were for household purposes only (there being no trade requirements,)  $7\frac{1}{2}$  gallons for each individual per diem were sufficient, so that all supplied above that quantity might be regarded as waste.

In addition to the various points which have been discussed in this article, there is another of no small public importance, bearing upon the question of the superiority of the constant over the intermittent system; we refer to the use of water in case of fire. Under the intermittent system, much valuable time is frequently lost in obtaining a sufficient quantity of water for working the engines, as the water, when turned on at the main, goes to fill the various house cisterns in the neighbourhood, and until these are full, a thorough supply cannot be had for the engines. On the other hand, under the constant, high pressure system, the mains being always charged, and the pressure full on, an efficient quantity can at once be procured from the stand pipes. A striking proof of the advantages of a ready and adequate supply of water, in this respect, occurred in New York; where, after the introduction of the Croton water into the city, it was found that the facilities for extinguishing fires were so greatly increased, that the insurance companies lowered their rates of premium.

**SPILLING THE SALT.**—It is a curious fact, not generally known, that the popular superstition concerning the unluckiness of upsetting the salt at table originated with Leonardo da Vinci's picture of the Last Supper, in which Judas Iscariot is represented in the act of accidentally overturning the salt-cellar.

## HYGIENE, IN ITS RELATIONS TO PRACTICAL MEDICINE.

By Professor JARVIS S. WRIGHT, M.D.\*

HYGIENE has to do with the means of preserving health, and Practical Medicine bears upon the cure of diseases. The latter is healing; the former is preventive. If an ounce of prevention is worth a pound of cure, as the saying goes, then Hygiene is of more value than Practical Medicine. Yet, do not suppose that I underrate Practical Medicine, for though a man will not allow you to drain his premises, ventilate his house, or arrange his dietary, when he is well, it does not follow that you should not know what to do for him when he falls ill.

First of all, then, let us have the clearest possible perception of the nature of disease; for such perception, and the knowledge that it brings, will throw a flood of light on the subject of Hygiene. And let us rise to this by familiar and well-understood forms of comparison.

How, for example, did the dram-drinker get *Steatosis* or *Sclerosis* of the liver? That is; how did his liver become in the former case a mass of fat, or how—on the other hand—did it become hard and knobby, like a mass of nutmegs? Alcohol, in some form or other, was the cause, and “gin-drinker's liver” was the result,—a definitive disease, one that you will often be called upon to treat, and one that you will sometimes have the opportunity to prevent. Suppose you were to give a man one drop of croton oil three times a day, it would not be very long before he would fall into a state of collapse, bearing a very marked resemblance to the collapse of cholera. Yet the latter is called disease, while the former is termed poisoning. Let the heat-ray fall upon the capillaries, and they dilate; let the light-ray fall upon the eye, and the pupil contracts. So opium congests the capillaries, and the pupil contracts.

\* An abridgment of a Lecture delivered at Long Island Hospital College, U.S.A.

The burning sun of summer may strike one down in the midst of vigorous existence; so may the electric fire from the rain-cloud; so opium; and so, too, may the malignant emanations from a swamp. But malignant malarial fever is called a disease; and can we not apply the term disease to sun-stroke, to lightning-stroke, and to opium poisoning? One septic poison will cause an eruptive fever, another will cause typhus fever, and another will cause typhoid fever. A fever is a disease; but we admit it to be due to "poisoning" by saying that a septic poison is the potential cause.

Disease is, therefore, a departure from the normal structure and the normal function, caused by some disturbing force. I say both function and structure, because, in our present state of knowledge, we divide disease into organic and functional. Of course, when the structure has undergone change, there is a change of function; and I am perfectly willing to admit with Rousseau, that every functional disease depends on change of structure. Hence, when our methods of observation have become perfect, it will, no doubt, be found that all disease is organic. Force acts on matter under organisation, and disturbs its organic relations; as the result we get disease.

Let me now call attention to some of the causes that operate to disturb the health of individuals—to such disturbing forces and influences as fall more properly within the province of Hygiene, and which are more or less preventable.

One of the most noticeable health-breaking factors is bad ventilation. The savage constructs poles into a hut, in the form of a truncated cone. He leaves an opening at one side for himself and the fresh air to enter. He leaves another opening at the top for the exit of impure air and the smoke of his fire. Our primitive people built chimneys with open fire-places in their log-houses. How simple, how perfect, for warming and ventilation! But the

evolved savage—the citizen—builds his house with four square walls, and leaves a door for the occupant to go in and out. There are windows, to be sure, but they are generally closed, and the curtains and the blinds bar the entrance of fresh air and sunlight.

The subject of clothing stands by the side of ventilation. The clothes we wear constitute a kind of peripatetic house. The birds of the lair and the beasts of the field have an annual or perennial dress. Man puts his dress off and on, evening and morning. Why the necessity of clothing animals and men? To protect, to warm, and to ventilate. What a network is made up of the pores covering the whole body! Close them absolutely by disease or with varnish, and death will supervene. You might as well stop digestion as stop cutaneous transpiration. Textile fabrics of material from Nature's loom, are the best for protection, for warming, and for ventilation. By such means we put a kind of lung on the body, over the pores. The textural inter-spaces contain a "residual air," which is kept nearly at the temperature of the body, and which slowly and evenly warms the constant afflux of cool, fresh air, while the deleterious vapours uniformly go outwards by diffusion. That is, therefore, the best clothing which best supplements the functions of the skin. I have a word to say with regard to the clothing of the young. And why do I say it? In order that you may be forewarned, and equipped for a crusade against a stronghold of ignorance. I make a plea for the innocent and the helpless who—such of them as survive—will, some day, be our men and women. Who clothe the young? It is done under maternal directions. How is it done? The legs are left bare, the arms are naked, the neck and upper part of the chest are exposed, scanty clothing is put on the body, and that is all. Why so? Would you believe it? It is done in this way to harden the little ones, to give them good constitutions! How cruel, how sad, how lament-

able may be the result ! The mother means this for good. But let her dress herself as she does her infant ; let her give the matter a fair trial ; the trial will not last long. Ought we to dissipate on the winter air the warmth that Providence has furnished for developing the delicate child into the full vigour of manhood or womanhood ?

Some facts of importance may be mentioned about food and drinks. The food we eat and the fluids we imbibe are transformed into the brawny arm that toils ; into the brain that thinks ; and into the heart that pulsates. Is it, therefore, an indifferent thing to consider what we shall eat and drink ? We have not the mysterious selective power of animals, which, magnet-like, draws them to their proper food ; and we must, according to our experience, choose what is good for us, provided we know. To choose what is good to eat and drink, is a matter of Hygiene. To choose what is not good for us, is to fall eventually into the hands of Practical Medicine. Chalk in sugar, beans in coffee, sulphuric acid in vinegar, and metallic facings in tea, are examples of health-breaking factors.

The appeal that went up from the yellow-fever stricken districts penetrated to the remotest parts of the States, and was answered with a shower of gold. People will give millions of dollars for charity, but not one cent for sanitary education. Heaps of garbage and filth were rotting and festering in the streets of the infected towns, under the rays of a torrid sun, because their inhabitants were ignorant of Hygiene. Had they been wise in Sanitary Science, their streets would have been swept and clean, and Practical Medicine would have been occupied only with its ordinary routine.

Hygiene has a wide circle of duties to perform. For instance :—the drainage system of Brooklyn lies under the streets ; it is the receptacle of all manner of uncleanliness, and it discharges through numerous outlets into the river and bay. From this huge subterranean intestine there is a communication with every

house. The kitchen, the dining-room, and the bed-room are separated from its pestilential vapours only by an insignificant water-trap, through which disease may glide, and do its work silently, yet too effectually. Here is constant work for Hygiene.

Intramural sepulture has been found to be detrimental to health, and sepulture now takes place outside of cities ; but the city grows—it invades the cemetery, and consequently it is alleged that burial of the dead is not in accordance with the principles of Hygiene. Why delay the change of “dust to dust, and ashes to ashes” ? Why wait scores of years for the decomposition of the body ? Putrid flesh and decaying bones are all surely going back to dust again. Many earnest sanitarians urge us to burn the bodies of the dead—to imitate that which nature does—but what we do, to do it quickly. A handful of grey ashes in a sepulchral urn will symbolise the “ashes to ashes, and dust to dust,” and rivet the links of memory. And then, of a truth, the dead cannot harm the living.

You will now begin to comprehend the meaning and the value of Hygiene. It teaches us how to use the means of preserving health,—that is, the science and the art of preventing disease. It teaches us how to bring pure air into our houses, and how to expel impure air ; how to warm our houses in winter, and to keep them cool in summer ; how to clothe ourselves and our children ; how to obtain pure food and to cook it scientifically ; how to prevent disease, and so prolong human life, and immeasurably increase the sum of human happiness ; how to do without medicines ; how to add millions to our country’s wealth, and to enhance, apparently without limit, her material prosperity.

The curability of disease bears a constant relation to Hygiene.

The poor man goes down in sickness, while the rich man rises up to health again. Could you see the small unventilated tenements where the poor live, and where the sunlight seldom comes,

you would not marvel at this. It is a disgrace to civilisation and to Christianity that rich men will continue to use their money in building such unwholesome abodes for those who "toil, and only toil."

### SANITARY HINTS TO HOUSEHOLDERS.

EVERYBODY theoretically values health; most people practically disregard it. Hence the obstacle to popularising sanitary science: because people do not bring it fairly into their daily thoughts. Yet the present greatly improved state of curative medicine is due, in a very considerable degree, to sanitary science: to the more careful observation of the natural action of natural forces, both in the living body and externally to it. Much has also been effected in the application of the principles and rules of sanitary science to the improvement of towns; but much remains to be done. With these preliminary remarks I will proceed to make some observations intended to be useful to householders.

*The Sources of Bad Smells in Houses.*—Most people are content with their habitations until they perceive a bad smell; then their trouble begins. Poor people, I have repeatedly observed, generally attribute a bad odour to some defect in their own houses, but rich people often cast the blame on their neighbours' houses. This arises from the occasional difficulty in detecting the source of the evil, and from the repugnance which a rich man feels to admit that after the pains he may have taken to perfect his drainage and ventilation, he has spent his money in vain. The first step towards the correction of a bad smell is to find out the cause of it, which is not always an easy matter. It may proceed from a sinkpipe, a watercloset, a waterpipe, damp walls, the sodden soil of the basement, or a crack in a gaspipe.

*Traps.*—Many people are quite satisfied if they have trapped their drains, and it is a

common answer to a complaint as to an unpleasant odour to say that "the drains are all well trapped." This is a delusion. Traps depend for their efficiency upon the water they hold, and if this is allowed to evaporate in warm weather there is practically no trap at all; or if the water contained in the trap be fouled by the absorption of sewer gas the trap becomes a means of diffusing poison; in fact, some traps seem to be designed for the purpose of accumulating dirt and noxious gases. The common "dipstone trap" is one of these. All traps should be freely and frequently flushed to prevent their becoming offensive, and it should be a maxim with householders that a trap will not keep itself clean.

*Forces Causing the Spread of Sewer Gas.*—Mephitic gases pass from drains into a house through three principal causes, namely: pressure, temperature, and diffusion. The pressure of sewer gas is but small, and water traps are constructed upon the assumption of this slight pressure. A difference of temperature between a house and a drain is a more frequent cause than pressure, and the sudden discharge into a drain of any heated fluid will lead to a rise of the sewer gases. Gases also diffuse themselves in accordance with a well-known chemical law.

*Stench Pipes.*—In order to carry off the foul gases generated in a sewer, a stench pipe is often erected against a house, the pipe running from the drain up to a height of several feet above the roof of the house, and the drain being trapped on the side next to the house. The reason for this is that it is thought that the pressure would be sufficient to force the gas up, say sixty feet of piping, but this is evidently an erroneous opinion. As already stated, the pressure of sewer gas is exceedingly small, and no adequate force exists, while, as to temperature, that would vary so much that no reliance could be placed upon it. In cold weather the draught would be downwards as in an unused chimney, and the sewer gases would be condensed in the pipe, and at all times, even the

most favourable to the action of the pipes, the mixture of the gases with the air would occur so low down the pipe that very little noxious gas could escape. Very little advantage, therefore, can be expected from these stench pipes. Sewer gas could not ascend the shafts in the majority of days of the year, and even if it did on days of exceptional temperature, the pipes could not conduct away sufficient gas to ventilate the sewers. The true protection against sewer gas consists in frequent flushing with an abundance of water, free dilution of the gases with atmospheric air, and numerous ventilators placed at the crowning parts of the sewers.

*Waste Waterpipes.*—Formerly waste waterpipes were connected with the drains to obviate the nuisance of accumulations of water upon the surface of the ground, but now it is the practice to have them disconnected. It is expedient that waste waterpipes, and sinkpipes should be trapped at both top and bottom. The lower trap should be a valve trap opening only in the direction towards the drain, and closing again by its own weight, on the principle of the “block trap” in use at the mouths of drains.

*Neglect of Traps and Dustbins, Dampness of Soil, &c.*—A very common cause of “bad smells” in houses is the carelessness of servants. In order to more easily get rid of refuse matters they remove the bell-trap from the sinkpipe, and an offensive effluvium is immediately perceptible throughout the house; or they throw dirty water into wastepipes and omit to flush them. Dustbins are allowed to remain uncovered, so that their contents become wet and sodden, and give off disagreeable odours; or vegetable matter is permitted to lie and rot in them in moist, warm weather. Dark cellars are often made the recipients of garbage and rubbish of all kinds not otherwise easy to dispose of, and as cellars are commonly damp, a fusty, fetid smell is the inevitable result. There are other causes of offensive odours,

the most enduring and persistently annoying of which lie deep in the structure of the house. The most frequent of these is the soakage of the foundation with sewage. Many of the old and, in other respects, best houses in the metropolis, were built on the bare clay, and were provided with brick drains and cesspools. Wherever this arrangement of drains and cesspools has existed, it will often be found that the bricks have been loosened at the base of the drain and have fallen in, and that the cesspools have overflowed; further, that rats have bored holes in every direction, thus increasing the mischief. The consequence of all this has been that the surrounding soil has become saturated with sewage. When this could no longer be borne, it has often happened that a jobbing bricklayer has been called in to lay down new pipe drainage, and the following is something like a description of the way in which he has set about it:—He has carried his new six-inch pipes along the course of the old drain on the already black, fetid soil as far as the area, where he has fixed a dipstone trap; besides that he has done nothing but allowed the old brick drain to remain in connection with the sewer. He has not even, perhaps, lowered his level in order to get a good fall; and the nuisance has remained as bad as ever, owing to the workman’s ignorance and bungling. Unfortunately such a case as this is not of an isolated character; for it has been a common practice with many “scamping” or ignorant workmen. The old soil should have been cleared out, and the pipes laid in concrete, with a good incline to the sewer. While the earth in the basement is allowed to remain sewage-logged, there must be “bad smells” in the house. The only permanent remedy is to remove the old soil and foundations, and replace with new, cover over with concrete, insert glazed bricks into the wall, and line with Portland cement.

*Water Supply.*—The water supply of London demands serious attention. So long as cisterns are used, they should be provided with char-

coal filters to purify the water before it is consumed; or, better still, one of Gitten's patent filters (the "Queen") should be fixed upon the pipe between the cistern and the tap from which the water has to be drawn for consumption. This is the only filter of its kind; exceedingly simple, as most good sanitary contrivances are. One important *desideratum* with regard to water for house purposes is a constant instead of an intermittent supply; even in that case, the "Queen" filter would be valuable, in order to insure an absolutely pure water for drinking and cooking uses. The only reasons why a constant supply is not universal are to be found in the activity of water companies in looking after their own interests, and the apathy of consumers in looking after theirs. There should be a more ample supply of water than is now given to the public. The sewers rarely contain more than a few inches of fluid; and deposits are apt to accumulate in consequence of there not being an adequate flow. When foul gases arise from the sewers, the fault is often due to the thousands of private drains which are insufficiently flushed, especially where the drains are of considerable length or connected with houses peopled by many persons. Further, the water supply of London is defective, by reason of the very large proportion of it which is derived from the river Thames. The time will, doubtless, come, when the importance of this fact will be more fully recognised, and when, as a consequence, the Metropolitan supply will be obtained from the practically inexhaustible natural reservoirs situated beneath the chalk, within 30 or 40 miles of London.\*

In conclusion, then, I would assert that four things are wanting as regards our water supply —a larger quantity, greater purity, better appliances, and unity of administration. The separation of the water supply from the public administration of the drainage system, and

leaving the former in private hands, is a mischievous incongruity, which has arisen out of the piece-by-piece legislation concerning sanitary affairs. The water supply should be everywhere, as it now is in some of our large towns, in the hands of the public authorities. M.D.

#### BRITISH HEALTH RESORTS.—No. 15.\*

##### DINSDALE-ON-TEES.

If a poll were taken of the readers of HYGIENE, it is doubtful whether 980 in every thousand of them would not be obliged to admit that, previous to the perusal of this notice, they had no knowledge of Dinsdale, its locality, and its manifold advantages as a health resort. Yet it has been so long recognised as possessing a mineral spring of great remedial value that Dinsdale Spa was entitled to celebrate its centenary two years ago.

The sulphur spring for which Dinsdale is noted was discovered accidentally in 1789, by some men who were employed in making experimental researches for coal. They had bored to the depth of seventy-two feet, through strata composed principally of red rock and whinstone, a basaltic geological formation, when the spring burst forth, accompanied with so much smoke and sulphureous smell that the workmen were compelled to relinquish their operations where the spring was situated for several weeks. The next step taken was to dig

\* The object of this series is to direct attention to the merits of different British Health Resorts, too often overlooked and neglected by persons who are put to much expense, trouble, and loss of time, in visiting Continental Spas, instead of availing themselves of facilities open to them in their own country. No. 1, Hastings and St. Leonards; No. 2, Cornwall; No. 3, Droitwich and its Brine Baths; No. 4, Swanage; No. 5, Isle of Man; No. 6, Lowestoft; No. 7, Llandrindod Wells; No. 8, Rostrevor (Ireland); No. 9, Cromer and Yarmouth (Norfolk), and Rye and Camber (Sussex); No. 10, Brighton; No. 11, The Undercliff, Isle of Wight; No. 12, Bournemouth, by Rev. R. A. Chudleigh; No. 13, The Climate and Surroundings of Bournemouth; No. 14, Yarmouth. Any single number can be had post free by remitting seven stamps.

\* See article on "Pure Spring Water for London," published in our July number.

a large hole in the ground, in the channel made by the water gushing from the spring, in order to form a somewhat primitive bath; this was resorted to by persons resident in the neighbourhood, and suffering from various affections. The first cure effected by the use of this sulphur bath was that of a man who, although he had been afflicted for many years with chronic rheumatism, obtained the complete restoration of the power of his limbs by using this bath and drinking water drawn from the spring. "There is nothing succeeds like success," and this and other practical illustrations of the remedial advantages derivable from the sulphur water in the cure of rheumatic and cutaneous disorders, soon made Dinsdale so famous throughout the district that, in 1797, suitable premises were erected, both for bathing in the water at its natural temperature, and for artificially heating it for warm baths.

Early in the present century, two local medical men, Dr. John Peacock, of Darlington, and Mr. Thomas Dixon Walker, a surgeon practising at Hurworth, a village near Dinsdale, wrote upon the subject of the sulphur spring at the last-named place, and thus assisted to bring its claims under public notice. We have before us a copy of Dr. Peacock's Observations upon the composition and uses of the Sulphur Water, published in 1805. This little treatise is written in a good sound style, and though one cannot refrain from occasionally smiling at the now obsolete and quaint phrases employed, it is evidently the work of a physician fully abreast of, and, indeed, in some respects, in advance of the medical science of his time. It sounds strange when he speaks of the *modern* "theory of pneumatic medicine" and enters into a grave and lengthy description of how the atmosphere is composed of oxygen, or vital air, and of azotic gas; but our readers must bear in mind that the period when Peacock's pamphlet appeared was one of the most prolific ever known in chemical discoveries, and it would ill become the present gene-

ration, on whose shoulders the next will stand, scanning still further and more clearly the horizon of science, to carp at the labours and researches of those who have preceded us. Seldom—perhaps never, before or since the close of the last century, and the commencement of this—has there existed such a noble body of men, working in common upon similar investigations into chemical science, for the cause of humanity, although widely separated from each other by distance, language, and the mighty events which then convulsed the greater part of Europe. Their names comprise Humphry Davy, Priestley, Beddoes, Cavendish, Erasmus Darwin, and James Watt (to whom we owe the principle of the construction of the steam engine,) in England, Lavoisier, and many others of equal note, in France, Germany, Italy, and many other Continental countries. Beddoes and Davy were, about the period of which we speak, actively engaged in carrying on at Clifton, near Bristol, an institution where the "*modern* theory of pneumatic medicine," of which Dr. Peacock speaks, was tested to the fullest possible extent.

But what we have to consider here is the practical aspect of the question. Dr. Peacock and Mr. Taylor were both agreed that the sulphur water was most beneficial in chronic affections, particularly of a rheumatic or dyspeptic character, diseases of the liver and spleen, and a whole host of cutaneous disorders; and the common *consensus* of all medical men since their day is with them in this respect. Several patients whom we have recommended to try the Dinsdale Spa, for cutaneous and rheumatic disorders, have subsequently assured us that they have derived more benefit there than anywhere else, either at home or on the Continent.

Having regard to these facts it would, at first sight, seem strange that Dinsdale Spa should, for so many years, have remained stationary, instead of rapidly progressing in general popularity. Indeed, the sulphur spring of Dinsdale was, perhaps, better known and

appreciated fifty years ago than it is now. But, unfortunately, there is a fashion in everything; and, of late years, it has been the unreasonable, we might almost say senseless, fashion for people to rush off to the Continent, at a considerable outlay of money and time, to visit some health resort where the benefit derived is not superior, even if equal, to that which would be obtained by a temporary residence at some British Spa, —particularly if the amount of unnecessary trouble and expense involved is taken into account. A good deal is said about the decadence of patriotism; we would remind the class to whom we have just referred, that patriotism, like charity, often begins best at home.

The best analysis which has been made of the Dinsdale spring is that of the late Mr. W. C. Wigner, who gives the following results, per imperial pint:—Dissolved gases,—sulphuretted hydrogen, 0.28 cubic inches; carbonic acid, 2.46; total of gases in solution, 2.74 cubic inches. Dissolved solid matter,—bicarbonate of lime, 4.93 grains; sulphate of lime, 12.31 grains; sulphate of magnesia, 6.51 grains; sulphate of potash, 1.84 grains; sulphate of soda, 1.34 grains; chloride of sodium, 3.57 grains; total of solid matter in solution, 31.80 grains. Without minutely discussing its chemical constituents, it will be evident that this water abounds in saline and sulphur products. It differs from the sulphur water of Harrogate in the respect that it contains a less proportion of aperient salts, but this circumstance is in favour of the Dinsdale spring, as the water, when drank, remains longer in the system and is consequently more efficacious. The quantity of sulphuretted hydrogen is considerable, and as very long boiling is requisite to wholly remove it, it must be evident (as has been specially pointed out by the late Dr. Granville, F.R.S., in his "Spas of England,") that this water is well adapted for warm bathing; a fair proportion of it will remain in the water after it has been heated, which is not the case where the water is less powerfully charged

with sulphuretted hydrogen. The amount of sulphur contained in the water may be judged when we mention that wherever it trickles a copious deposit of sulphur remains; and this may be scraped up in large quantities. The effect of the sulphur vapour upon metals, notably gold and silver, is remarkable; the former it imparts a silvery hue to, and the latter quickly assumes a dirty, leaden appearance. Mr. Messenger, the courteous manager of the baths, and pump-room, and of the new Spa Hotel, since its opening, told us an amusing anecdote of a gentleman who, having come to the establishment for a warm sulphur water bath, hung his silver watch on a peg in the bath-room in order that he might know the time during which he was in the bath. After dressing, he went off in the direction of his lodgings, but, discovering that he had left his watch behind, quickly retraced his steps. Upon the attendant fetching the watch and chain, the gentleman indignantly asserted that they were not his property, strongly asseverating that his were made of silver. The only way in which he could be convinced was by showing him the maker's name, and drawing the attention to the peculiar pattern of the guard.

So far, one spring only has been spoken of, but others exist at different parts of the same estate. There are two sulphur springs, one strong, the other milder, in chemical composition, situated in a wood about a mile from the present Spa; and at the old manor house of Dinsdale, not quite so far distant, a sulphur spring formerly bubbled up in the moat which partly surrounded the house. When the moat was drained into the Tees some little time since, the spring disappeared. In the garden of the manor house there is a chalybeate spring, the water of which contains iron in considerable proportions. This might be turned to good account, in the treatment of anaemia, debility, and other kindred disorders; either by itself, or alternated with the sulphur treatment. In speaking of the sulphur springs in

the wood, we omitted to mention a singular fact as regards the principal one, namely, that it always remains at the same equable temperature, unaffected by changes of atmosphere, and never freezes in the coldest depths of winter. In summer it is deliciously cool; in winter, owing to its temperature being so much higher than that of the surrounding objects, it gives off a hot, steamy vapour.

It would seem as if there were no limitation to mineral springs at Dinsdale, for more recently another new spring has been discovered in the above-mentioned wood. The analysis of its constituents by Mr. A. W. Stokes, F.C.S., Public Analyst for Paddington and other important metropolitan districts, shows that this spring is rich in sulphate of soda and sulphate of magnesia, thus resembling the celebrated Carlsbad water.

The country surrounding Dinsdale Spa is charming, and it would be impossible to imagine any more suitable position for a resort for patients desiring quiet, pure air, and beautiful scenery. The Spa pump-room and hotel are situated at the foot of a high hill, within a few yards of the river Tees, whose sparkling, pellucid stream gives a never-ceasing musical ripple as it flows swiftly along, now over shallows, now through deeps, in its course towards the sea. A pretty walk along the river bank in one direction, leads to a clean little village, aptly styled Middleton-One-Row, from the houses being built on one side of the road only; here there are numerous comfortable lodgings for persons who desire to reside near to the Spa while using the sulphur water. Stretching away to the right of the hotel, and passing in an upward direction close to the winding river, the path leads through the pleasant woods which cover the sloping hill, in the direction of the manor house, and of the wood in which the other springs that we have referred to are to be found. The manor house itself abounds with antiquarian associations. Very extensive Roman remains have been un-

earthed in the immediate vicinity of the manor house, and it is not improbable that, nearly eighteen centuries ago, Roman warriors availed themselves of the facilities for bathing in the water derived from the Dinsdale sulphur springs. At the side of the road leading towards the manor house, there is an ancient elm tree, said to be 700 years old, the survivor of two which formerly stood in that position, known as the Abbot's elms. Some idea of the tortuous course which the Tees takes may be formed when we mention that in a walk of one mile in this direction, a semicircle is described. An iron bridge above this point crosses the river, connecting the Durham (left) bank with the Yorkshire (right) bank of the Tees, and bringing within a short walking distance of each other the villages of Dinsdale-on-Tees, and Nesham, on the Durham side, and of Over-Dinsdale, on the Yorkshire side. Until the construction of this bridge the distance between these villages, respectively, by another bridge was ten miles; whereas, now, it is barely a mile. The church of Dinsdale is very ancient, and has of late years undergone complete restoration. The church and lands connected with it were given by one Ralph Surtees and his wife, to provide lights for the altar of St. Cuthbert. The manor and estate of Dinsdale are still in the hands of the Surtees family, who have been connected with Dinsdale since the Norman period. The family name is itself derived from the banks of the river on which their estate is situated. In old chronicles we find the name of Ralph Dittensdale, also described in the bad Latin of that date as Ralph de Super-Teysam—Ralph of On-Teys; otherwise, in Norman French, Surteys, which has become modernised into Surtees. Before retracing our steps to the Spa Hotel, we must first take a look at the salmon leap, called Fish Lock, a barrier consisting of a stone wall, some seven or eight feet, thrown nearly across the river. In early summer-time numerous salmon which have come up from the sea may be

frequently seen endeavouring to leap the weir.

Returning to the Spa Hotel, we rest in front for a few moments to glance over the rural scenery of the vale of Cleveland, sometimes described as the "garden of Yorkshire," on account of its fertile soil and highly cultivated condition; and we then ascend the hill, at the foot of which (as we have already stated) the Spa is situated, so that we can get a glimpse of Dinsdale Hall. This is a spacious mansion which was erected by the first Earl of Durham, about fifty years ago, at a cost of £35,000, in those days of cheap materials and cheap labour. It was carried on for some years as an hotel, but it has been more recently diverted from that purpose, to which it was admirably adapted, both by its commanding position, and the number and size of its rooms. Amongst the many distinguished persons who patronised it when it was conducted as an hotel were the first Duke of Wellington and the Baroness Burdett-Coutts.

Dinsdale Spa is easy of access. The railway journey from the metropolis is accomplished in a few hours by fast trains to Darlington, whence Dinsdale is reached in a few minutes by the branch of the North Eastern Railway running to Redcar, Saltburn, and other seaside watering places. This constitutes a great inducement for persons in quest of health and change to visit Dinsdale, as they can readily alternate their residence, spending part of the time at the coast, and the remainder inland at Dinsdale. Until four years ago, the nearest station to Dinsdale Spa was a place known by the euphonious name of Fighting Cocks, two miles away, on the Darlington and Stockton line. This line is remarkable as the first on which steam locomotive power was brought into practical use. A clause in the original Act of Parliament passed in 1821 empowering its construction, stated that the carriages were to be propelled by means of men and horses, "or

otherwise." Shortly after the Act was obtained George Stephenson was appointed engineer, and, at his instigation, the promoters applied for a new Act enabling them to work the railway with locomotive engines. "Otherwise" gained the day, and, on the 27th of September 1825, the line was opened for steam traffic, despite the direst prognostications of the evils that would result. George Stephenson himself drove the engine, named the "Locomotion," and astonished all his detractors by attaining an average speed of five miles an hour! "Great oaks from little acorns grow," and we practically realised the truth of this proverb on our return to town by making the run from Grantham to King's Cross, 105 miles, in just over two hours.

In taking leave of Dinsdale Spa we would point out that, while it requires to be made better known, it would also be desirable to keep fully up to the times by various improvements and additional accommodation. This could be effected with a judicious expenditure of capital. The large mansion on the hill could be converted into a first-class hydropathic establishment; the present Spa Hotel could be continued for those visitors who might prefer the comparatively greater privacy of a smaller house; the pump-room and baths should be enlarged to meet the growing needs of the crowds of visitors who would be attracted to the place by increased residential accommodation; and, during the summer months, temporary shelters should be erected close to the various springs which have been enumerated, for the convenience of those persons who might be disposed to resort to them for the purpose of drinking the water. These improvements could be better effected by a syndicate or company than by a private owner; but, in any case, they could not fail to be productive of large pecuniary profit, while extending the benefits of the Spa to a much larger section of the community.

W. A.

## ILFRACOMBE.—No. 16.

ILFRACOMBE is at the extreme north-west point of Devon, and a better position for a watering place could hardly be found. Looking almost due west the vast mass of Lundy Island is seen rising above the restless waters, and to the north, for forty miles, stretch the Southern Highlands of Wales, that exquisitely beautiful and romantic land, faithfully preserving, among its most precious treasures, its ancient and musical tongue; while its people are passionately devoted to what may be called a popular congregational form of religious service.

Upon the land of the ancient Cymri Ilfracombe looks, and from Swansea to Combe—the local name for the beautiful watering-place—the distance is hardly thirty miles. To the east stretch, for fifty miles, the gracefully wooded heights of the Bristol Channel, in places leafy and picturesque to the water's edge, in others bare and rugged. From Combe to Cardiff and Bristol, a distance of fifty miles or more, extends that magnificent water-way, down which come thousands of stately ships and swift moving steamers, and which is at times ploughed by cheap excursion boats—from Bristol and Portishead. A pleasanter spot than Ilfracombe it would be hard to find, with an individuality distinctly its own, a something wholly unlike the south coast, and totally different to the Lancashire watering-places; in short, though no two towns are ever the exact counterpart of each other, and no two are strictly comparable, Ilfracombe may, in its way, as Bournemouth is in another, be said to be the solitary representative of its class.

Until recently, Ilfracombe was hardly more than a fishing village, doing a large coasting and fishing trade, and its growth has been rapid, though not so fast as to destroy its quaint rural simplicity. Unfortunately, it is not easy of access, and one may say that though only fifty miles from Taunton or Exeter, hardly more than half the difficulties of the journey are surmounted when the traveller alights at Taunton

or at St. David's, Exeter. Even from Barnstaple, the North Devon junction for Ilfracombe, the approach is tedious, by train skirting the coast, at times getting charming glimpses of the sea and of the steep sides of Lundy. Arrived at the terminus, boldly perched on a lofty artificial embankment, the descent into the town is short and rapid. A glance shows that the place is in a transition state; new houses are springing up everywhere—handsome shops and roomy villas with a sprinkling of hotels, but there are vestiges of the old life, and the fishermen lazily sauntering about, rather handsome, picturesque folk as a rule, have the typical Devon features, accent and bearing.

From being placed, as it were, on the sea, and from having the prolongation of rock known as Capstone Hill—jutting far out into the water, but excellently adapted to be a vantage point to look over the waters—no other place known to me has more to offer in the matter of contrast between a bright, calm, sunny day, and one on which the wind and the clouds have it their own way. The play of the light on the water is at times exquisite, while on a day when the clouds are rolling up like masses of oil, and one sharp squall succeeds another with startling rapidity, the effect is equally impressive. Nothing surpasses the beauty of a still, sunny day; nothing the majesty of a day of mingled squall and sunshine, and such contrasts occur at all seasons. A day of uniform heavy cloud is not favourable for seeing the Atlantic to perfection: then the dinginess and gloom recall those of a cloudy day in a large inland town, but to get the effect of alternate sunlight and squall the day must be one on which both types of weather have the ascendancy for short seasons, and follow each other in rapid succession. It is the poet's privilege to convey, in few words, ideas which the prose writer needs pages to expand and work out, and so I quote the charming lines of the late Mr. James Manson: the first part describing the ocean in calmness and peace, the second

in equally appropriate language reproducing it on one of those days of turmoil and confusion, when to the imagination of northern races the spirits of the night and of the dead are rushing in fierce disorder and conflict over sea and land.

## I.

"Summer Ocean, Placid Ocean,  
Soft and sweet thy lulla'b'y,  
Shadows lightly, sunbeams brightly,  
Flicker o'er thee noiselessly.  
Resting gently on thy bosom  
Snowy sea gulls preen their wings,  
While perfumed sighs from many a blossom,  
Float around the strain the skylark sings.  
Love's emotion! Summer Ocean,  
Like thyself 'neath cloudless skies,  
Glances brightly, dances lightly,  
Till the fond illusion flies.

## II.

Winter Ocean, Furious Ocean,  
Fierce and loud thy choral lay;  
Storm clouds soaring,  
Whirlwinds roaring,  
O'er thy breast in madness play.  
Homeless petrels shriek their omen  
Harshly 'mid thy billows' roar.  
Fleshless bones of shipwrecked seamen  
Dash against thy rock-ribbed shore.  
War's commotion! Winter Ocean,  
Like thyself when tempest driven.  
By passion hurl'd would wreck the world,  
And mock the wrath-scowling Heaven."

Charles Kingsley, whose pride in his native county has almost passed into a proverb, gave Combe long years ago what he pleasantly called "the puff, honest and true." He spoke of "its quiet nature and its quiet luxury, its rich fairy land and its sea walks, its downs and combes, its kind people, and, if possible, its still kinder climate, which combines the soft warmth of South Devon with the bracing freshness of the Welsh mountains." His brief lines sum up the chief features of the place, and are as true to-day as when first written.

Ilfracombe has only a population of 8,000, though, it is said, 200,000 visitors resort thither during the season. Lodgings and boarding-houses abound, and accommodation can be got at all prices, and, as a rule, living need not be dear. The sick and death rate is low, indeed, Ilfracombe is said to have an abnormally low death-

rate. The visitor can pass weeks enjoying his new surroundings and exploring the neighbouring country, much of which, however, is greatly elevated, bleak and bare, and presents a pronounced contrast to certain valleys, the home of ferns and flowers in rich and bewildering profusion. One of the most impressive contrasts I have ever seen between verdure, richness and fertility, and bleakness, sterility and bareness, is between the deep, sheltered, leafy, fern-embellished road leading out of Nailsworth, in Gloucestershire, and the same road as it crosses the downs towards Minchinghampton and Cirencester; the commencement all loveliness, variety, warmth and shade, the next part all bleakness, monotony and coldness. I cannot recall any contrast so decided in the neighbourhood of Ilfracombe.

The summer at Combe is cool and at times charming, and when bad weather comes, of which it has its full share, it is well to remember that in other parts of the kingdom matters are not better, while in winter there is much sunlight, and less frost and fog than inland. In that calm, still, cloudy weather, not rare in winter in England, there is commonly at the sea shore sunshine, the higher-temperature of the water dispersing the cloudy canopy, or not permitting it to form. The rainfall of North Devon is heavy, but relieved by long spells of dry summer weather.

To the south-west of the town lie some dangerous and magnificent cliffs, on which shipwrecks have been common. The full force of the westerly and north-westerly gales, little felt in a sheltered town or inland valley, but a terror to the sailor on a lee shore, bursts on those cruel rocks, and woe to vessels embayed there. Morte Point is a name of ominous import to fisher-folk. An old proverb has it: "Morte is the place on earth which heaven made last and the devil will take first." Kingsley's charming description is in his best style: "What a chaos of rock ridges—old, starved Mother Earth's bare worn rocks and

joints peeping out through every field and down, and on three sides of us the sullen thunder of the unseen surge. You see that black rock awash far out at sea. That is the Morte Stone, the Death Rock, as the Norman christened it of old, and it does not belie its name even now."

Many excursions can be undertaken if the visitor has a good command of money. One of the greatest charms of money is that foreign travel becomes possible, while as for seeing our own little island, how easy that is. It has never been my fortune to be master of an income in any degree sufficing for my frugal wants, and when I have seen the world I have had to compress long journeys in excursion trains, followed by many hours of rapid walking, into a space of time that to most self-indulgent, slow-moving Englishmen would be anything but delightful. Only thus have I contrived to explore a large part of our tiny island. I can assure the reader that a little money in the long days, combined with a large expenditure of foot exercise, accomplishes wonders, and even a poor doctor can contrive not to be entirely cut off from those enjoyments, which happier men command as a matter of course. I once managed to start from Ringwood, in Hants, and before my tour ended in Birmingham, had been to Liverpool, New York, Philadelphia and Richmond in Virginia, at a money cost to myself of £9 9s. 3d., but I must confess that I worked my passage out and back from Liverpool to New York, while I did not spend a penny on horses and carriages during my whole absence from home; what I could not see on foot I did not see at all. If one wants to see the world there is nothing like walking. From twenty to forty miles can be easily covered in fourteen hours, and a couple of sovereigns will, with the help of tourist tickets—that priceless boon to travellers—enable 600 to 800 miles of railway travelling to be managed. It has been by dint of great frugality and energy that I have contrived to traverse Devon from end to

end, and explore its lovely woods and hills and its sea-coast towns, and thus it was that, doing a little at one time and a little at another, I managed to get a good knowledge of the neighbourhood of Ilfracombe, seeing Barnstaple, Lynton, Lynmouth, Paracombe, and other pretty though little known places near.

Among the loveliest spots in England is Clovelly, with its well-nigh perpendicular streets; Bideford, with its ancient and noble bridge of twenty-four arches; Westward Ho, Swansea, Lynton, Lynmouth, the Valley of Rocks, Watersmeet, and Lundy Island are only a few that give diversity to the holiday. Lundy is so prominent a feature in the scene, and the visitor hears so much about it, that more than a passing word ought to be given to it.

The mildness of Ilfracombe makes it an excellent place for sufferers from bronchitis and other chest complaints, and though the winter-day temperature is not materially higher than that of many other places in the southern half of the island, the rarity of severe and long-continued night frosts, the prevalence of bright sunshine, and the soft, damp air are soothing, and ward off disease. Something must be allowed for the more active habits generally formed in a new place of residence. Invalids, if they face the expense and trouble of leaving home, are willing to bestir themselves, and get some good from the change; moreover, there is a zest in outdoor exercise not experienced in one's ordinary residence. At any rate visitors go out day after day for hours, and sit out on the rocks and benches as they would not do at home, and not only with perfect impunity, but they get the benefit of fresh and unpolluted air, and are kept from breathing, day after day, the close, hot atmosphere of small, stuffy rooms. This is the correct explanation of the good which many people get from staying at the seaside; that benefit would not always continue to be marked, for, after a time, the new residence would lose its freshness and interest, but for a brief season

everything seems peculiarly beautiful and charming. So it comes about that Ilfracombe has attractions, in a quiet way, not equalled by many other health resorts at home.

The greatest drawback is the wind, which rushes down upon the town with a fury that makes outdoor exercise often peculiarly disagreeable, at least to me, and I vastly prefer calm cold of much greater intensity; still many visitors for a time find the fresh breezes, gales we must not call them, invigorating and delightful.

No description of the town would do justice to it that did not dwell upon some of the salient features of the neighbourhood, and of the part it has played in literature,

Who has not read that quaint, scholarly book, "Lorna Doone," the finest work from the untiring hand of its gifted author, Richard Dodridge Blackmore? The scene of that story is placed by its author, who once lived near Barnstaple, in a deep romantic glen on the borders of Exmoor Forest; Glen Doone is within a day's excursion of Ilfracombe. In spite of the constant changes going on in England, the migration of families and the uptearing of the family tree, one is also greatly struck by the frequency with which the continuity of English life comes down to our days, almost without a break, from remote times. Every reader of "Lorna Doone" has been amused by Farmer Snow and his family, and has laughed at the not unfriendly rivalry among the yeomen of a couple of centuries ago. The Snows still live in the neighbourhood, and are still respected and opulent, though emphatically denying that they belong to the yeomen class. Some years ago, for several days, I saw a good deal of some of them, and was amused by listening to the familiar and pleasant accent, and still more characteristic provincialisms, that proclaim the Devon man the whole world over.

The north coast of Devon and Somerset is unfortunately difficult of access, except at its extremities. The North Devon line passes a

good many miles inland on its way from Taunton to Barnstaple, but there are convenient stations, and a few long midsummer days are alone needed to penetrate through the forest tract to the channel, seeing all one can wish of Oare, Bagworthy, and Glen Doone. The stranger must not expect timber, but a forest in the more exact sense of a vast tract of uncultivated wild country, unenclosed and practically useless except for the chase. There are, nevertheless, on the outskirts of Exmoor, which is in Somerset by the way, some charming spots. Is anything more picturesque than Dunkery Beacon, and, further off still, the velvety turf and wooded slopes of the valleys between Tiverton and Bampton? And near Dulverton and around Dunster the country has an English beauty all its own. To do much, however, a noble disregard of fatigue and long distances must be cultivated, and then few more attractive centres for a long summer holiday can be found than Ilfracombe, the most delightful of North Devon watering-places.

S. U. M.

### THE PHYSICAL TRAINING OF THE YOUNG.

By Dr. ALFRED J. H. CRESPI, Wimborne, formerly Editor of the *Sanitary Review*.

THE wise King of Israel lamented that there was nothing new under the sun; and he was right. What remains for me or anyone else to say on the physical training of the young? The Spartans drilled their young men and their maidens, the former to defend and uphold the State, the latter to be the healthy mothers of vigorous children. They went farther than we should dare to do, however, for being essentially a drilling aristocracy, dominating the subject races of their little kingdom by sheer force of superior strength and determination, they, by a careful system of selection, weeded out the feeble by putting to death all infants who seemed too frail to grow into healthy men and women. Under such a system, muscle counts for more

than intellect; and neither Alexander Pope nor Lord Byron would have been permitted to survive early infancy. The test was rough and brutal to a degree that no humane people could tolerate for an hour, but it answered its purpose excellently, and in an age and among a people where the State was everything and the individual nothing was unobjectionable enough. We go to the other extreme. With us the individual is too much considered, the State and the majority too little, and personal liberty has, consequently, a tendency to degenerate into dangerous licence that does not benefit the nation nor always make individuals happier. But we are doing much by gentle means. Seventy years ago, on the authority of one of the Sturges, of Birmingham, that town swarmed with factory cripples, that is, with persons who had been physically ruined by taking to cramping and unhealthy trades too early in life; possibly the result of this early employment might have been that the individual became a better machine and did his work more thoroughly, but his physique suffered, and an early death generally awaited him, while his offspring were dwarfed and deformed, and in the course of a few generations the greater capacity of the puny ancestors to get through certain kinds of work must have been succeeded by a race generally unfit for any hard work at all, intellectual or physical, and practically doomed, fortunately for them and the world, to early extinction. The Factory Acts have been a priceless boon to the nation; they have saved many millions from some of the worst miseries of life. Perhaps they do not go far enough, and Elizabeth Barrett Browning's pathetic "Cry of the Children" would still find an echo in the hearts of many an unhappy, ill-developed little one, sent all too early to labour in a noisy, unhealthy factory.

But we are moving. Society is at last admitting that every child has certain claims on the State, as well as on its parents; he has his rights no less than his duties, and he has not

received his due unless fairly educated for the fierce battle of life, and fit to render good service to the community—educated, that is, intellectually, while his body should also be trained and developed by healthy, natural, outdoor exercise.

Unfortunately the working classes cannot spare much time for the purpose. We may have free education some day, the best that money and the age can afford, in, possibly, large school buildings on the most approved modern principle, and we may enclose all but an insignificant fraction in the net; still the unfortunate fact remains that the exigencies of time and poverty cannot be overcome. Children of the working classes must commence to work and to earn early, and there is not sufficient time to give them that complete intellectual and physical discipline which will stand them in such good stead in the journey of life.

Nothing is more melancholy than the rapidity with which the smiling, rosy, clean, intelligent boy or girl of twelve or thirteen, to be seen in a thousand national schools, becomes dirty and unhealthy when put to heavy work; the whole appearance alters, the health suffers, the spirits decline, and it requires a positive effort to recognise in the over-worked little drudge the healthy bright child of a few months earlier.

The rich have little cause to complain; life with them is commonly a triumphant and merry progress; it begins with a public school career of eight or ten years, giving usually very poor results as far as mere book learning goes, although it imparts a certain confidence and graceful ease of manner that never leaves its fortunate possessor in later life, and it ensures a familiarity with boating, football, cricket and other lighter amusements such as tennis, pleasant enough to the well-born gentleman, whose personal needs cost as much to satisfy as would keep half-a-dozen middle class families, and who would as soon expect the world to stop as that his own wants should not be

gratified. An upright carriage, a keen eye and a trained hand are secured, and a few agreeable years, or rather portions of years, at one of the Universities, complete the education so pleasantly begun—this is the education of the affluent gentleman, who is said to play at his work and to work at his play. Our great public schools have been called the finest establishments in the world for training athletes, and it is of course well known that many of the young men who have had the privilege of being educated, as it is called, at Eton or at some other school of that class, often prefer distinction in athletics to fame in the class-room, and to be one of the school football team or cricket eleven is more highly valued than to come out well in the schools at Greats; indeed, I can remember, when at Oxford myself, as well as before I went there, how persistent was the attempt to show that a man could acquit himself equally well at athletics and in the schools; and whenever a man who had rowed in the university eight took a good degree he was pointed to as an unanswerable proof of the truth of an assertion that, after all, was not of universal application. As for the upper-class Englishmen, with no occupation in life beyond taking his pleasure, who rarely reads and rather prides himself on not being a scholar, there is little fear that his body will be uncared for, and though he cannot always distinguish himself by his dexterity and superior physique, he can at least criticise others unmercifully. Perhaps he holds it, "as our statists do, a baseness to write fair," but generally, unlike Hamlet, he finds little need to labour much to forget his learning, for it has a wonderful proneness to take wings to itself and fly away. With the average well-born, opulent Englishman, who can spend £1,000 a year on his personal requirements, with little to show in return, and who could hardly earn a thousand pence a year were his existence to depend upon his so doing, we have here little concern; it is with the poor and with the lower middle classes, those who make up the bulk of the nation and

outnumber a hundred to one the idle sons of luxury, that we are interested. How is their physical training to be carried out? With the Continent a vast camp, and the preparation for war always in progress, it is a matter of primary importance that the working classes should receive some kind of physical training, which should put them on an equality with other races. An unarmed nation could not hold its own for a day in the costly, unchristian game called war, while a weak nation invites attack. Were it not for the *silver streak* we could not exist without huge armaments and the conscription; providentially the need is not so urgent, still, although we escape the cruel burden of universal military service, and of armies nominally maintained by the State, but actually, as in France, supported in large measure by their families, who have to liberally supplement the halfpenny a day of the French cuirassier, we cannot altogether escape the payment of this unholy blood tax. Every efficient athlete, every skilled volunteer, helps to prevent war and to keep off an attack, so that the greater encouragement in reason we can give to outdoor sports the less the chance that the military party in our midst will force on us the conscription, with its attendant swollen armaments and enormous expenses, a burden that might, fairly estimated, reach a figure double, perhaps treble, as high as our present military and naval expenditure.

Let us take the working classes first, and consider what useful suggestions can be made. The necessity of commencing work early and the scanty leisure are serious obstacles; nevertheless, wherever and whenever practicable, parents should be made to see the importance of keeping their children at school as long as possible, while every school establishment should have some kind of playground attached to it, and the pupils should be systematically taught scientific games. The gain to themselves would be incalculable; their carriage would become freer and more graceful, their

stature would often be developed, their sight would be relieved and strengthened by the eyes not being so constantly fixed on small objects close at hand, and the habit of working together would be formed—and the last is not the smallest advantage accruing from proficiency in athletics. I am not sure that two afternoons a week given to scientific games and drill would not be an invaluable part of the education, and in many cases the habit would be formed of finding pleasure not in the mere rough romping often called play, but in games requiring quick sight, a trained hand, and considerable agility. Nothing is prettier than to watch a class of children put by a competent mistress through what is a form of drill, and which greatly improves the carriage. I do not know whether national schools usually give such training: all should. Intellectual vigour is greatly affected by bodily health; exceptions there may be, but they are only exceptions, and it is undoubtedly the rule that if the mind is to be healthy the body must be kept strong and vigorous, and that can never be the case in the foul atmosphere of an ordinary factory, nor in the close air of a small house, confined at back and front by a thousand others of the same stamp.

Rich and philanthropic employers can do much, and, I suspect, greatly to their own advantage in the long run. The first thing is to remove their factories into the open country, where the air is good and space abundant. The honoured name of Cadbury Brothers, the famous cocoa manufacturers, of Bournville, Birmingham, occurs to me as an excellent case in point. These gentlemen—illustrious members of that small but revered religious body to which John Bright, Joseph Sturge, and Elizabeth Fry belonged—some years ago rebuilt at Bournville, on a vastly larger scale, their new works. Land was cheaper than in Broad Street, where they used to have their factories, and the new establishment could be afforded ample space, while the workpeople were given fresh air.

*But here* was the point; it was obviously far more convenient to many of the staff to live on the spot or near it, and this has led to a large number taking houses close to their place of employment; thus they have been *compelled* to breathe pure air, and they have been enabled to have gardens, and in many cases semi-detached houses, in a neighbourhood pretty enough not to fear comparison with Devon and Dorset. But the gain does not end here; in addition to better air while at work and ample space, as well as country houses, the benevolent heads of that great concern do their utmost to encourage out-door games, and even provide asphalte courts for the purpose. The superior carriage of the workpeople is a proof of the wisdom of this generous outlay, and it is possible that the world-wide fame of Cadbury's cocoa, as the best in the market, may in some measure be due to the greater intelligence and healthiness of the workpeople, whose bodies are well cared for, and whose employers are foremost in admitting that they are in some degree responsible for the welfare of their servants. I venture to think that hundreds of other great firms, blessed with ample means and a national reputation, could, in like manner, remove their factories from the squalid surroundings of the low, narrow streets of large towns a dozen miles out into the open country.

What is more beautiful than a strong, vigorous, healthy man in the full flower of manhood—upright and active, well nourished, splendidly developed, equally capable of hard work and of innocent enjoyment? Nothing known to us approaches in complexity and beauty the human body; the most intricate machinery ever devised by the human intellect and perfected by human fingers is clumsy in comparison. The beauty of a healthy human body can only be imperfectly understood, even by those whose life-long occupation it is to study its mechanism, while to most people it is an unknown world fuller of wonders than the Indies. Where did Raphael find his inspiration? in

...hat field did he achieve his greatest triumphs? In the contemplation of the Mother, the Babe, and the Saint; not in Nature, properly so called, but in him who is the Lord of Nature, and who, in the beautiful and reverent words of Tertullian, was "created in the likeness of God; for God, when He made man, took for pattern the future man Christ."

True, flowers and animals may be, nay, often are, exquisitely graceful and beautiful, and deserving of all admiration, but it is in the contemplation of man—his body, his intellect, the finished work of his hands—that the greatest enjoyment lies.

The rich can take care of themselves; the very poor may yet have their wants attended to by the State and by wealthy employers. But between these two extremes lies a vast class, particularly strong in the larger towns—the toiling, thrifty, busy, straitened lower middle classes, those who do everything for themselves, for whom the State provides and does nothing; those who have no leisure, no means, no aristocratic traditions, no early educational advantages; it is these for whom the heart aches—living their own little narrow lives, hampered by every expense, and cut off from most of the enjoyments of life. How can girls ride whose parents dare not spare a pound a year on amusements? How can lads join in cricket, tennis, rowing, football, when the school has its headquarters in a small, cramped building, with a veritable yard and nothing more as a playground? To the humble clerk or shopman, and the small tradesman, even a few shillings are a serious matter; the one great object of existence is *not* to spend money; the wants are so many, the resources so limited, that the cost of a tennis racket cannot be faced, while a dozen tennis balls a year could not be afforded, and the modest subscription to join a club could be ill spared. The very competition downwards among the managers of such schools as are alone within the reach of children of this class makes it out of the question to provide

playgrounds and to give physical training. It is a melancholy reflection that there are hundreds of thousands of families in this position, families whose sorrows made the great heart of Charles Kingsley bleed—the lads with only a life of labour before them, more continuous, more worrying, and often not better paid than that of mechanics; the girls compelled to help in the house, in the first place to relieve the overworked, overdone mother, and then expected to add to the family income by working in shops, as milliners, or as inferior teachers. The workpeople in such well-appointed establishments as those of Cadbury Brothers are much better off than people apparently a couple of rungs higher up the ladder, because their hours are far shorter, and they have the summer evenings, if nothing more; but the shop girl, the milliner, the inferior governess, the third-rate clerk, with hours too long for any constitution to bear—what is there for them? I have often pondered over this painful question; I have thought of the volunteers, of cycling, of gardening, of I know not what besides; but then, when I have remembered the long hours, what could I suggest? I know at this moment a gentleman in Birmingham whose life is little better than a funeral march; he sometimes gets to his office at six, though generally not till nine, he has a brief breathing space for dinner and a few minutes for tea, and he leaves at something between nine and eleven; even his Sundays are not always his own, and he has to take his turn at office work. He has had twenty-eight years of this grinding labour; in a busy year he has no holiday, no Good Friday, not even Christmas Day; sometimes not even a single clear week, no, nor one whole day away from home the whole of the livelong year. Bank holidays are as though they were not as far as he is concerned. Of course this is an exceptional case, but, though not in the smaller, where competition is not so keen, many little more enviable could be found in every large town where the struggle for existence is en-

grossing, and physical exercise is impossible, disregarded, unthought of. What a heritage of suffering and misery is the result!

The lower middle class parent will have to be educated, but how I know not, to recognise his duty to his offspring, and as much as possible assist him *not* to play at his work and work at his play, but to relieve the monotony of life by health-giving, innocent amusements. He should take some pride in his children, and learn to regard scientific games as not less necessary and useful than good food. Again, the benevolent and influential could often do a great deal. They could provide facilities in a variety of ways; for instance, a rich family could lend its tennis lawn to a club of poor neighbours one or two afternoons a week; cricket fields could be placed at the disposal of groups of lads for rougher but more useful sports, and much more might be done to provide garden ground in small plots for decent families at reasonable rents. There are many small towns in which it is almost impossible for a man, disengaged in the evening, to get a piece of land, however tiny, within easy reach of his house. Fertile fields may extend far and near, and *one* of these fields, divided into a hundred allotments and let at moderate sums, would be a priceless boon to a hundred families, and would practically mean a considerable rise in their wages; but such plots cannot be got, and the father is tempted to betake himself in the evenings to the public-house, while the children play in the streets or are confined to the common sitting-room in the mean little house. The comfort is that matters are improving, and that more people are becoming alive to the importance of outdoor exercise for young and old, and of systematic physical training for the children of both sexes. I have tried to avoid the too common error of attempting to point out how the young can, as a rule, have such opportunities provided, because my knowledge of the stern realities of life in our great towns warns me that an ounce of practice is worth a pound of theory, and that

it is useless to make light of difficulties which those behind the scenes know are often insuperable. More is being done than heretofore, and I venture to predict that the day is not distant when every child, not physically disqualified by disease nor too sorely handicapped by indigence, will have opportunities of training his body as well as his mind; the latter is being well looked after, the former is still too often disregarded.

### FLESH DIET AND VEGETARIANISM.

(From the Croonian Lectures, delivered by Dr. C. B. RADCLIFFE, at the Royal College of Physicians, London.)

I CONFESS to being a heretic in matters of diet. Do what I will, I cannot bring myself to accept the current belief that butcher's meat is food *par excellence*, and that all other food is little more than "padding." On the contrary, I feel convinced that views and practices in this respect have changed infinitely for the worse, and that, herein, perhaps, may be found one main reason why various nervous disorders are so numerous and often so difficult to deal with.

Few persons with any practical experience will, I think, maintain that the diet of "Training," which is relatively rich in lean meat and poor in the other constituents of diet, especially in the oleaginous, can be kept up for any length of time with absolute impunity. The fact, indeed, is simply this, that an extraordinary degree of muscular strength is got up, not by the diet simply, but by the whole plan of training, in six weeks or thereabouts, and that, afterwards, the man in training gets out of "condition," every day perceptibly losing muscular energy and firmness and pluck, and becoming headachy, feverish, and out of sorts in every way.

Often, indeed, do I meet with persons who are just in the state of those who have been over-training, who are not "up" to any work, bodily or mental, and who tell you that they cannot for the life of them tell why they are

so, for they have not been taking it out of themselves by work of any kind, and have been doing all they could to keep up their strength, drinking beef-tea by the quart, eating meat three times a day, and so forth, and who get well with little else to help them when they begin to eat like other people, taking everything, and not too much of anything—and who do not get well until they do as just stated.

And most assuredly the actual experience of different people is not to be appealed to in proof of a contrary conclusion. The strapping gillie of the Scotch Highlands, the chief staple of whose food is oatmeal, with a little milk, is certainly not wanting in muscular strength and power of endurance; on the contrary, as every one will admit who has had to keep up with him in a hard day's deer-stalking, for he is "all wind and limb" when his master for the time being is panting and staggering. Nor is the case of the gillie different from that of the Italian labourer, who is seen at work unloading the small coasting corn-vessels on the beautiful shores of the Bay of Naples, whose food is made up chiefly of Indian-corn pudding or polenta, with a little macaroni and a little oil. This man may be lazy enough, but when called to work he works well enough, as is sufficiently proved by the light way in which he dances from the vessel over the black sand with the heavy sack on his shoulders, and this not once or twice only, but for hour after hour, even in the heat of the day.

It is certainly possible for people to enjoy excellent health upon the most different kinds of food. No doubt there are individuals who take kindly to animal food, and others who do not. Most probably a properly mixed diet is best for the generality of people, in this country at least; but all the evidence, as I can read it, is against the notion that meat is to be the food which must be had at any price. At all events, I cannot help thinking that the present practice of urging persons at all weakly, especially children, to eat as much

meat as they can, may have not a little to do in causing the development of many nervous disorders, and in deranging the health in other ways besides—perhaps in causing liver and kidney and other glandular disease, by over-taxing the eliminating powers of these organs.

It is high time, I take it, now that meat of all kinds is only to be had at high prices, that all people, and particularly the poor, should be shown that animal food is not so essential as they believe it to be. It is high time, for instance, that the English poor should be taught to imitate the French in their diet. But I must not dilate upon these matters, nor must I attempt to lay down any definite rules of diet. Indeed, all that I must allow myself to do is to reassert my belief that excess of animal food, relative or actual, is a very important cause of many disorders of the nervous system, and that in the prevention and treatment of these disorders it is all-important that the oleaginous and farinaceous articles of diet, rather than the nitrogenous, should be fully supplied.

I maintain, indeed, as I have long done, that the nerve tissue (which consists, in great measure, of a kind of fat) is starved if the hydrocarbons are withheld, and that this withholding is one main reason for the speedy breaking down in overtraining; and I further believe that this is not the only way in which the want of hydrocarbons operates mischievously. Indeed the fact that muscular work shows itself in the amount produced of carbonic acid, convinces me that the hydrocarbons are necessary for action as well as for nutrition in nerve and muscle—are necessary, perhaps in keeping up the electrical charge of nerve and muscle which, as I believe, has so much to do with nervous action and muscular action.

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FOREIGN FRUITS imported into this country—apples, peaches, pears, oranges, &c.—amount in value to more than four millions of pounds annually. Of this large sum, it is estimated that about £1,200,000 would represent fruits which might very well be grown in our country, thus putting a good sum yearly into the pockets of British fruit growers and farmers.

## HOSPITAL CLOTHING, BEDDING, AND WARDS.

By GUSTAV JAEGER, M.D., Stuttgart.

THE point of most consequence in hospital clothing is not the clothing of the nurses, but the clothing and bedding of the patients, and the nature of the furniture and walls of the room. If the former be all of pure wool, and the furniture be either of iron, or so painted or varnished as to be wholesome; further, if the walls are treated in the manner which I will subsequently explain, two eminent advantages will be achieved:—

1. Patients will sooner rid themselves of the poison of their disease, and will therefore sooner be cured, for the same holds good of disease-poisons as of the attenuated self-poison of healthy people. The power of attraction which plain wood and dead plant-fibre possess for evil odours prevents the escape of the latter according to the laws of diffusion, and defeats in great part, if not altogether, endeavours to ventilate.

2. These measures minimise the chief of the two conditions necessary to infection, namely, the tendency to disease, a consideration which is especially important, because the great facility with which disease-germs are conveyed renders the most careful rules insufficient to prevent their transport.

As regards the clothing of nurses: in order that it may not collect the human poisons which are generated in sick-rooms and that the nurses themselves may be proof against epidemics, they should be clothed in wool throughout. This clothing should be protected (but only when they are actually nursing) by a cotton or linen cover, which should be washed daily.

Lastly, as to the walls of rooms. Many authorities on hygiene attach much value to the so-called porous ventilation—*i.e.*, to the fact that ordinary walls are pervious to the air, and thus insure a certain amount of ventilation. Covering the walls of a room with oil-paint is therefore condemned as shutting off this means of ventilation. I formerly held the same view, and caused

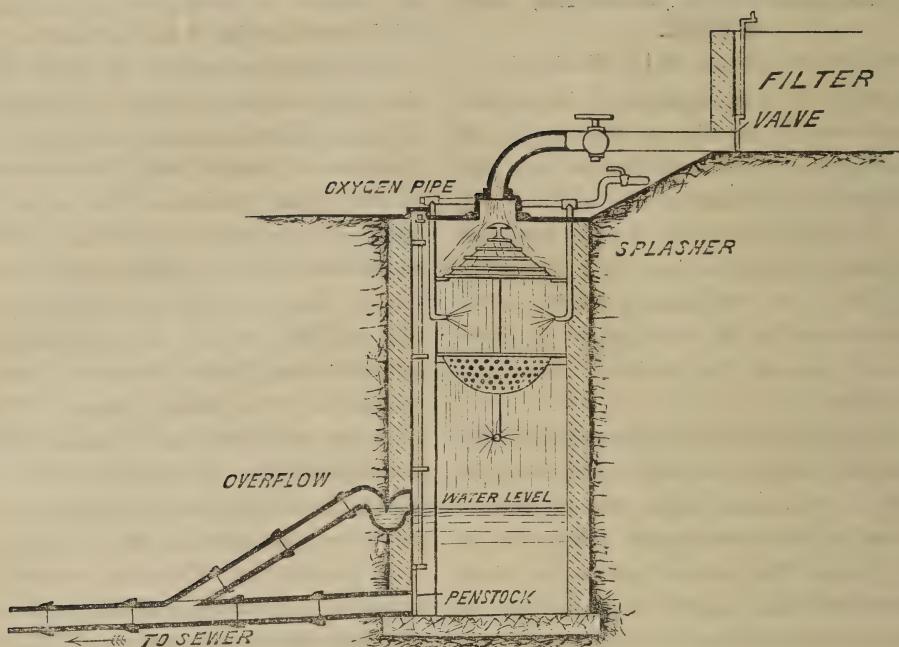
my walls to be distempered; but since I have tried the other plan I have altered my opinion, I first caused my staircase, in which there was always an unpleasant smell, to be treated with oil-paint, with the result of greatly improving the freshness of the air, and I have subsequently painted other portions of the interior of my house with a similarly satisfactory effect. The explanation is very simple: the relations of plaster, lime, and stone to odours are similar to those of plain wood; through their surface-attraction they hinder the egress of malodorous exhalations from living beings. When the walls are unpainted, and especially when they are papered, the air cannot be pure, and the ventilation which takes place through the by no means fragrant materials of the walls is nothing to be grateful for. Oil-paint destroys the evil influence, and offensive odours pass away into the outer air much more freely than before, even without any special ventilating contrivance.

Let the experiment be tried, in some one room of a hospital, of coating walls, flooring, and all woodwork and wooden furniture thoroughly with oil paint; not merely the parts which are seen, but inside, outside and all round; let the bedding and clothing of the patients be wholly of pure wool, and then estimate the result by the evidence of the nose! In such a normal hospital ward the atmosphere will, under equal conditions of ventilation and cleanliness, be distinctly better than that in ordinary wards.

## THE TREATMENT OF EFFLUENT SEWAGE WATER.

ONE of the greatest and most persistent difficulties with which sanitary authorities have to deal is the mode of treating the effluent water from sewage which has had the solid constituents removed.

A common cause, too, of the pollution of rivers, and a source of endless, costly litigation throughout all parts of the kingdom, is the practice of permitting effluent sewage water to



be discharged into either the rivers themselves or small tributary streams—brooks or ditches—eventually opening into the rivers.

The millions spent annually in devising and adopting temporary expedients for the mitigation of the evils arising in this way, and in law costs incurred through the breaking down of these temporary expedients, represent in the aggregate, when spread over a number of years, an enormous national waste of money and time; while our rivers and streams become every year a greater opprobrium to the local authorities charged with the sanitary supervision of their respective districts.

To remedy this deplorable, disastrous, and disease-producing condition of things has long been the dream and the hope of sanitary scientists; but though some of them seem, for a time, to have gone near the mark, all have been obliged, sooner or later, to admit their failure.

We have just said “all,” but we feel disposed to modify that expression, and to write “all but one,” that solitary instance of theoretical and practical perfection being an invention recently patented for Great Britain, the United

States, and the principal European countries by its inventor, Mr. Edgar E. Scruby, of Epping.

The illustration which appears with this article will serve to convey some idea of the completeness, the simplicity, and the automatic ease of this method of dealing with effluent sewage water. After the solids have been precipitated the fluid portion of the sewage is subjected to a process of filtration and then conveyed into an air-tight chamber charged with oxygen. The water falls on to a ribbed cone, thus insuring its sub-division; afterwards, it passes through a perforated plate, ensuring further sub-division—a process that may be repeated for any number of times that may be considered desirable. By means of this sub-division of the stream, insuring longer and more complete contact with the oxygen contained in the chamber, oxydation becomes an absolute certainty. Three remarkable and valuable results are accomplished: the bad smell of the effluent is destroyed, germination is prevented, and microbes are done to death through being introduced to a chemical element not in harmony with their singular ideas of well-being.

Sewage effluent water that has been submitted to Scruby's process will keep bottled for a much longer period than soft water under similar conditions.

It may be further noted that effluent which had not been treated in accordance with Scruby's patent, assumed in four or five days at the most a repulsive green tint; while effluent which had been dealt with by the oxydation process that we have described retained for twelve days or more a natural, clear appearance.

The cost of making the oxygen gas is not worth serious consideration, as once the receiving chamber has been charged with oxygen, no replenishing will be required for a comparatively very long time.

The working expenses will also be kept down by the circumstance that the apparatus is automatic in its action.

In addition to the fact that by this system effluent may be dealt with effectually, economically, and expeditiously, a second fact must not be lost sight of, and that is, that wherever potable water supplies are obtained from suspicious and doubtful sources, the risk of disease being conveyed through its medium can be positively guarded against by the adoption of the Scruby process of treatment before it is allowed to pass into the mains. In fact, any water supply companies taking their supplies from rivers would be guilty of culpable negligence if they omitted to avail themselves of the Scruby process of purification.

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#### CAN CATS SEE IN THE DARK?

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THE eye is not yet made which can see in absolute darkness; consequently, even cats require some small quantity of light. But the quantity that enables them to see is so very small as to be virtually darkness to creatures whose eyes are not furnished with the very singular apparatus called *Tapete lucidum* (the shining carpet). It is simply a tract of reflecting

surface placed like a concave mirror at the back of the eye-ball by which the scattered rays which enter the pupil from all sides are caught and reflected back through the pupil. And it is remarkable that in all the species which possess it, this natural reflection is so shaped and placed as to throw out the concentrated rays on to that spot where the habits of each animal would make the light most useful.

Thus in the ox and sheep, the rays are brought to a focus near the mouth and nostrils, manifestly the spot where grazing animals would like the light turned on. Thus bulls had "bulls' eyes" before the police, and used them in the same manner. In the dog and cat the rays are not brought to a focus so near to the mouth. These creatures must scan objects much more distant than the grass at their feet, and consequently the rays are projected from their eyes forwards and downwards and in nearly parallel lines. Thus the stream of light is available for much greater distances than if the rays came to a near focus and crossed and were dissipated.

In the horse this *Tapete lucidum* is well developed. It is so placed as to combine the advantages of the ox eye and the cat's eye; that is to say, the outer side of the reflecting surface sends rays downward and inward, evidently to help it to eat; while the inner side throws the rays downward and forward, thereby securing a much wider sweep.

Birds and fish have no *Tapete*, though we should have expected an exception in favour of owls and night birds. Rats and mice have none either, which seems rather hard, seeing that their enemy the cat is so well provided.

It will have been noticed that in all cases the rays have been described as being reflected downwards. This is the same as saying that the *Tapete* lies high on the eye-ball. There is one noteworthy exception, the giraffe. In this animal the *Tapete* is placed low and reflects the rays upward. But the giraffe feeds above its head; so in this case also the light falls where it will be most useful. R. A. CHUDLEIGH.

## Notes and News.

**WATER DRINKING: ITS HYGIENIC VALUE.**—Dr. Lauder Brunton says that when a patient's liver is seriously out of order he always puts the question, "How much water do you drink?" Almost invariably with sufferers of this class the answer is, "I hardly touch water. I am not a thirsty person"; ignoring the fact that water is the universal solvent, and is useful not merely in flushing our drains, but also in performing a similar function in the cells of which our organs are composed. Dr. Brunton is prepared to admit the healthful effects of a sojourn at some health resort famous for its mineral springs; but what strikes him most is the fact that people who at home never drink water, except so far as it enters into the composition of tea, coffee, or wine, are to be seen at these places, swallowing tumbler after tumbler of what is after all nothing but water, with a little common salt and traces of other salts in it. They might do the same at home; but then, as Dr. Brunton says, if you were to tell a fashionable lady to get up at six o'clock in the morning, and walk round Grosvenor Square, with a tumbler of hot water in her hand, taking a sip of it at every third step, then to buy a penny roll and eat this without butter for her breakfast, with a small cup of coffee and nothing more, she would laugh at the notion. Worse than that, she would probably apply to some other physician for advice.

**THE NORFOLK BROADS**, to which reference was made in our articles on Yarmouth and Lowestoft, are in danger of being closed against the public. The claims made by the riparian proprietors thus to deprive the public of the pleasure and benefit to health afforded by sailing and boating on these expanses of water are of a preposterous character, and should be strenuously—in which event we believe that they would be successfully—opposed; and we recommend all of our readers interested in the subject of free open spaces, whether land or water, to support the Norfolk Broads Protection Society, which has been formed for the purpose of safeguarding the public rights to unrestricted access to the Broads. The honorary secretary is Mr. T. J. Woodrow, 18, Coleman Street, London, E.C.

**SOME PEOPLE ARE ALWAYS COMPLAINING ABOUT THEIR HEALTH.**—Professor Lee, Principal of Edinburgh University, was one of this class, and seemed to take positive pleasure in expatiating on his ailments. He was met one morning by Professor Robertson, who expressed a hope that he was well. "Far from well," said the Principal; "I've had no sleep for a fortnight." "Then, Principal," replied Professor Robertson, "you must be getting better. When we last met you had not slept for six weeks." Somewhat similar to the Principal's exaggerated way of putting his case was that of a gentleman who consulted a physician. "I

can't tell what's the matter with me, Doctor," said he, when asked to give an outline of his symptoms, "for I work like a horse, I eat like an ox, and I sleep like a dog." "Oh, I see," interposed the physician, judging rightly what a troublesome, fidgetty patient he had before him. "But you have made a mistake in coming to me; you ought to have gone to a veterinary surgeon."

**QUININE.**—It is a curious fact that while the annual supply of quinine for the whole world is estimated at about 6,000,000 ounces; more than 3,000,000 ounces—one-half of the entire quantity—are consumed in the United States. Owing partly to over-production, partly to the substitution of other drugs for quinine, the price of the article has fallen so much of late years that large plantations of the cinchona tree have been uprooted in Ceylon, and the tea plant cultivated in its place.

**CHEAP VEGETABLES** for winter use may be expected if the "silo" system should be extended from grass food for cattle to other vegetable food for human consumption. A Berkshire farmer has succeeded in preserving broccoli and cabbages in pits, for several winters past, thus insuring a supply of fresh vegetables at a season when the supply is very limited. It is stated that, after being in the pits for four months, the cabbages come out as crisp and fresh as when put in.

**HITTING THE RIGHT NAIL ON THE HEAD.**— "Doctor," said a gouty patient to a physician who knew his habits, and whom he had called in, "I want you to be thorough, and to strike at the root of the disease." "I will," exclaimed the doctor, at the same time bringing his cane down sharply on a decanter which stood on the sideboard close by.

**NICOTINE.**—This extractive principle of tobacco is so powerful a poison that a single drop of it applied to the eye of a cat will destroy the animal's life in a few minutes. Cats, dogs, or rabbits will die in twenty or thirty seconds if even less than a drop is placed upon the tongue, so rapid is its absorption, and so virulent are its poisonous properties.

**FILTRATION ON A LARGE SCALE.**—A limit to the rapidity of filtration has been generally adopted by the London water companies. It is represented by the passage of about five hundred and forty gallons of water through each square yard of the upper surface area of the filter in twenty-four hours, or two and a half gallons through each square foot of surface per hour. Water passed through well-constructed filter beds at a rate not exceeding this becomes, under ordinary circumstances, bright and clear.

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## EDITORIAL NOTE.

IN consequence of the pressure upon our space through the publication of the report of the seventh International Congress of Hygiene several papers of great interest—amongst them that read by Sir Henry Thompson on Cremention—stand over till our October issue. The series of special articles on patent medicines will be resumed in that number, "Mother Seigel's Syrup," being the subject of the October article, constituting No. VIII. of the series. We should esteem it a favour if any of our readers would supply us with information concerning this or any other quack medicines.

## THE SEVENTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

ALTHOUGH six previous Congresses have been held in different Continental cities—viz., Brussels, Paris, Turin, Geneva, The Hague, and Vienna—this was the first occasion of one being held in London, a circumstance which served to enhance the interest taken in it by British sanitarians. The objects and nature of the Congress have already been fully described in the official programme published in the July number of HYGIENE.

The opening meeting of the Congress was held at St. James's Hall on August 10th, under the presidency of the Prince of Wales, the

assembly numbering between two and three thousand persons, many of them eminent in their respective countries for their sanitary knowledge and high professional position. A glance around the immense hall sufficed to show that our foreign brethren were present in considerable force, in many instances accompanied by their wives, sisters, cousins, or aunts, for whom, we may mention, in passing, admirable arrangements were made by the Ladies' Reception Committee, having head-quarters during the week at Messrs. Agnew's Art Gallery in Old Bond Street, liberally placed at the disposal of the Congress by that firm.

After the presentation of the report of the permanent international committee by Sir Douglas Galton, the following inaugural address was delivered by the Prince of Wales:—

It gives me great pleasure to open the proceedings of this Congress, and to offer a hearty greeting to all its members, especially to those whom it has induced to come from distant countries. Many as have been the meetings for good purposes over which it has been my good fortune to preside, there has very rarely, if ever, been one of which the object has been approved by a greater weight of authority. The importance of our Congress is proved, not only by the large number of members who have assembled here to-day, but by the names of those who are on the list of its officers, both honorary and active. Under the Queen's patronage this list includes, together with several members of my family, some of the principal members of Her Majesty's Government, the presidents of nearly all the medical corporations, representatives of the Universities, and of the chief medical and scientific societies in the United Kingdom, delegates from nearly every

great country in the world, and from all our sanitary institutions and medical schools, many official representatives of our Colonies and India, the Lord Mayor and Sheriffs of London, the Masters of several of the City Companies, and a great majority of those who, here or elsewhere, have gained the highest renown in the study of public health or of the sciences most nearly allied to it. All these approve the design of the Congress, and they may well do so, for in so far as its object can be fulfilled, it will everywhere bring good to all classes of society. As one looks through our programme, it is impossible not to feel distress and even horror at the multitude of dangers to health in the midst of which we have to live. Some of them appear at present to be inevitable, but the great majority may certainly with due care be averted. I cannot pretend to be able to judge of more than a few of these dangers, but I would take as examples those to which my attention was especially drawn when I was a member of the Royal Commission on the Dwellings of the Working Classes. I learned much there of the dangers to health which may be ascribed to the constant increase of our great manufactories, and to other industries, from which especially come the overcrowding of our towns, the building of huge factories, the pollution of our atmosphere, the accumulation of refuse, the fouling of rivers, the impurities of earth and air and water. I learned not only of these dangers, but of the immense difficulty of increasing, or even maintaining, our activity in all branches of trade without incurring heavy risks to health, more particularly in our chief centres of population. The task of averting them might have appeared hopeless, but I have rejoiced to see how much has already been done in diminishing them, and to observe how our registers bear witness to the decreasing mortality in our large towns, to the increasing average length of life in the whole population, and of many facts proving the good influence of our sanitary institutions. But on them I do not now propose to dwell. I will only conclude from them that the good already done, and the constantly increasing knowledge of the whole subject, may make us sure that much more good may still be attained, and that neither this nor any other nation should be content until prosperity in business and all other things desirable for the national welfare are made consistent with national good health. How the many dangers which our programme indicates may best be dealt with will of course be discussed in the several sections. It will be no trivial work if their sources and probable remedies can be clearly pointed out, and especially if this can be done—as in a Congress such as this it should be—in a strictly scientific manner, calmly and dispassionately, without any reference to either general or municipal politics, or for any other purpose than the promotion of health. It is only on conviction such as may thus be produced that the appointed sanitary authorities can compel the changes necessary to be made; for such changes are almost always inconvenient or in-

jurious to some, and might even seem unjust to them, unless it be made quite clear that they would be very beneficial to the community. But my hope is that the work of this Congress may not be limited to the influence which it may exercise on sanitary authorities. It will have a still better influence if it will teach all people in all classes of society how much everyone may do for the improvement of the sanitary conditions among which he has to live. I say distinctly "all classes," for although the heaviest penalties of insanitary arrangements fall on the poor, who are themselves least able to prevent or bear them, yet no class is free from their dangers or sufficiently careful to avert them. Where could one find a family which has not in some of its members suffered from typhoid fever or diphtheria, or others of those illnesses which are especially called "preventable diseases"? Where is there a family in which it might not be asked, "If preventable, why not prevented?" I would add that the questions before the Congress, and in which all should take a personal interest, do not relate only to the prevention of death or of serious diseases, but to the maintenance of the conditions in which the greatest working power may be sustained. In this I include both mental and bodily power, for the highest possible prosperity must be when men and women of all classes, rich and poor alike, can safely do such good and useful work as they are fit for, and for which they are responsible to those among whom they live. To this end it is essential that they should enjoy the best possible health and vigour, and to obtain these it is necessary that everything possible should be done for the promotion and maintenance of the national health. Such then is to be your work; let me say our work, for though I cannot further contribute to the proceedings of the Congress, I shall watch them with much interest, and shall always strive to promote whatever may be here plainly shown to be useful for the public health.

The following speakers then addressed the meeting.—

Dr. BROUARDEL, Dean of the Faculty of Medicine of Paris (speaking in French), thanked the Prince of Wales, on behalf of the French members of the Congress, for the interest he took in its proceedings. They were aware that in England public opinion was ready to second the efforts of sanitary reformers; they had a sure guarantee of this in the history of the last half century. After referring to various measures which had been passed in this country for the improvement of the public health, and especially mentioning Jenner, Dr. Brouardel said that even in England the discoveries made had not immediately borne all their fruit; the anti-vaccination leagues were not yet dead. Proofs accumulated during a century had not sufficed to open all eyes; it was not only physically that persons were born blind. He referred to the revolution which in the last fifteen years medical doctrines, especially those most con-

cerned with hygiene, had undergone—a revolution which surpassed in importance all those of which history had taken notice. Could France be represented in a congress of hygiene without recalling the name of M. Pasteur? Thanks to his works, and to those of his pupils, realities had succeeded to contingent possibilities. We know some of our enemies, their habits, and their mode of penetrating the body; up to this time man had been conquered by these infinitesimal bodies, but, thanks to recent discoveries, he would be their conqueror. When at the beginning of a century one could inscribe the name of Jenner, and at the end that of Pasteur, the human race might rejoice; more had been done for it against misery, disease, and death than in any one of the centuries which had preceded it.

Dr. VON COLER, Director-General of the German Army Medical Service, speaking in German, on behalf of the German Government as well as of the German delegates, said:—I have to offer you the warmest thanks for your kind invitation, and I need hardly add how highly I appreciate the great honour thus conferred upon me. The great number of delegates alone who have been sent from my native country to attend this Congress clearly prove the lively interest felt at home in all the future labours and deliberations of this distinguished assembly. It is indeed with a feeling of joyous pride if from this place and in this country, where we have to trace the very cradle of all modern science of public health, I am permitted to point out how the many efforts made in the direction of hygiene radiating from England were, especially in Germany, hailed with much delight, where they received the most careful attention, and where they ever since have been most actively promoted. And for all that has been done there existed good reason. Mankind has to ever struggle against, to ever resist the forces of Nature, the subjection of which is the goal of our efforts. The highest degree of culture is alone to be found where man has most perfectly subdued to his will Nature. In that formidable struggle it is hygiene which forges the most efficient weapons. Of eminent usefulness, refreshing and invigorating, is the spring that flows from every science, but so full of blessings, so advantageous to the common welfare and to individual happiness, scarcely another science exists equal to hygiene. Germany has herself gone through that experience. Could I lead you from our most magnificent palaces to the humblest homesteads of the toiler—show to you the arrangements of our metropolis and those of a lonely workman's shop—all and everywhere the observing eye would meet with valuable hygienic efforts and improvements, all serving to benefit the single individual as well as the community. The dearest to the heart of the German nation is its army, formed by the sons from all ranks of the people. And it is this grand institution which, independent of a rarely-occurring war, in times of peace and for the furtherance of peaceful purposes, has become its national school of physical and intellectual

development, a source of the highest virtues of mind and body, a source of our sublimest ideals. It is in this fine national institution, where the blessings of hygienic science have abundantly been received, where the greatest success may daily be distinctly observed. We must thank above all, hygiene and her teachings, if it has been possible to considerably lessen, from year to year, the number of patients in the army, and to reduce the number of deaths to a minimum. In the year 1888-89 alone 79,500 men applied for surgical or medical treatment, below the average of the ten preceding years. Consequently many hundred thousand days of sickness which formerly had to be placed under medical treatment have now been won for better physical and intellectual education of the men. The death-rate has diminished by two-thirds in the same time (from 6.9 per cent. in 1868 to 2.3 per cent. of the present force in 1888-89), and during the last year we counted at least 1,500 deaths less than in 1868. Comparing these figures with the numerical strength of the army of the present day and of that year, what an amount of national fortune and human happiness we trace in summing up these events! Every single man, when he attains the age to serve in the army, represents a pretty fair-sized capital, which to secure in the national interest has been the successful task of hygiene, and incalculable are the beneficial consequences which lay in the fact that in every year ten thousand more of our men now remain healthy and free from the germs of disease—men who, after completing their military services, return home, peacefully settle down, and offer in their robust state of health the best guarantees of becoming fathers of a healthy rising family. Truly, considered in this light, the costs of hygienic arrangements are, through the results they bear, more than a hundredfold repaid. If from our army diseases like malaria, small-pox, dysentery, have completely, or almost completely, disappeared, if typhus fever and diphtheria become more and more diseases of the past, we have to be thankful for these attainments to the development and application of hygiene. Proved by experience, it is now an established fact that infectious diseases are by no means a necessary evil in the army. They are simply diseases which can be avoided, which can be powerfully opposed, and against which the science of our days battles victoriously with ever-increasing success. We all fervently hope that the councils and resolutions of the Congress may lead to the advancement of science, to the happiness of men, and to the glory of this great and hospitable country.

Professor CORRADI (of Pavia), speaking in Italian, said that the chains were ancient which bound his country to England, and science had made them more lasting. Lanfranc, of Pavia, and Anselm, of Aosta, restored learning to Canterbury in the eleventh century, and later William Harvey reunited the names of the two nations in the field of science by demonstrating a fact of which the fundamental principles were discovered

at the Anatomical School of Pavia. The discovery of the circulation of the blood was the most solemn testimony of the truth that one mind began great things and another finished them. That remarkable event signalled one of the greatest moments in the history of science, not only by the fact itself but by the new spirit which it infused into biology, in which was the foundation of hygiene.

Mr. JOSEPH KOROSI (Director of Municipal Statistics of Budapest) read, in English, a paper in which he said the present occasion was not the first on which the representatives of statistical science had met under the patronage of Queen Victoria. Thirty years had passed since the International Statistical Congress met in London to do its fruitful work. The Prince Consort on that occasion, spoke words of wisdom and benevolence that were gratefully remembered; but their gratitude was due, not to individuals, but to the great English nation, for England was the mother country of statistics, and especially of demography. That branch of science—which, in fact, was a science in its own right—had chosen the task of investigating the laws which regulated the life, the increase, and the decrease of nations. Its work comprised three main parts: statistics of natality, of mortality (which part included biometry), and the science of measuring the duration of human life and of the increase of population. When inquiring who were the founders of the new science they heard quoted the names of England's sons—Graunt, Petty, Halley, and Malthus. It was in the hall of the Royal Society that Graunt, two hundred and thirty years ago, established for the first time the problems of demography. The science travelled through the world, being worked out in Germany, receiving a name and new ideas in France, and being enlarged and imbued with a more scientific character in Belgium, and now, after a triumphant career, it returned to its home, and again the throne of England received it with favour and benevolent interest.

Dr. W. ROTH, of Dresden, speaking in German, on behalf of the German committee, complimented England as a country which surprised foreigners by the gigantic scale of its sanitary institutions and experimental researches. It might be truly said that England saved other countries the trouble of experimental investigation. This work was facilitated by the character of the English people, who applied themselves zealously to everything new, the practical necessity of which they were convinced of, and did away with all minor obstacles, especially the financial ones. Germany gratefully acknowledged the progress in the science of hygiene, which was due to the influence of the school at Netley. Dr. W. Roth then bore ardent testimony to the value of the labours of Edward Alexander Parkes, whose lectures at Netley had attracted all those who took an active interest in the progress of hygiene, and whose lasting monument was his "Manual of Practical Hygiene," which had become the base for extensive hygienic work; nor must his friend and successor, Dr. Chaumont, be forgotten. Dr.

Roth concluded by expressing the hope that it would be the spirit of Parkes which would guide the transactions of the Congress.

Sir JAMES PAGET, who was greeted with repeated applause, moved a vote of cordial thanks to his Royal Highness for his goodness in accepting the office of President of the Congress, and for the manner in which he had conducted the business of that day. No one knew better than he (the speaker) did what an immense advantage the Congress would derive from having the Prince of Wales as President. No one could remember more clearly than he did the great advantages which were derived by the International Medical Congress of 1881 by the patronage and presence of his Royal Highness. If he might attempt to define the purpose of the present Congress, he would say it was that of endeavouring to find or develop the means by which the population of every nation in the world might attain as soon as possible the highest possible level of health, both of the body and the mind. He had not himself been connected with sanitary affairs—except so far as his work on Royal Commissions was concerned—but he could not but see that there had always been the need that sanitary science should call to its aid the knowledge that could be obtained in every branch of medical science. The programme of the Congress recognised that need. There were many sections, a great variety of work having to be undertaken, and every section understood that its materials were only, as it were, parts of one great design. In the course of medical science one constantly saw a tendency to divide the work, and one also encountered the belief that each section of the study was able to accomplish all that was necessary. No error could be more mischievous. Every section of learning must be subject to the criticism of every other, and there must be a readiness to act in concord for a common end. The necessity for that was indeed well shown by the width and variety of the subjects to be considered by the Congress. Some men who called themselves very practical might think there was a good deal in the programme that might never come to anything like utility, but the whole history of science showed that the highest utility had commonly been derived from the profoundest depths of scientific research. The great discoveries of M. Pasteur had had their beginning in research into alcoholic fermentation. It was strange that a research into that one particular matter should have resulted in the knowledge that had prevented the spread of some of the direst diseases to which we were subject. In that connection he might mention that two of the subjects of the Congress were "Bacteriology" and "Preventive Medicine," and they might reasonably hope that those two subjects would lead them to such knowledge as might tame the worst diseases, so that to their successors those diseases would be comparatively harmless. He noted the necessity for the pursuit of the most scientific subjects as tending necessarily to the advancement of national health. Governments might well encourage and pro-

mote such pursuits. In our own country excellent work has been done by the Health Department of the Local Government Board. Much more remained to be done, however, and it would be well if the great loud voice of this immense Congress were to make it clear to every government of the world that it was equally part of its duty to promote the cultivation of the deepest science as to promote the ordinary routine matters of sanitary progress.

Dr. BUCHANAN, chief medical officer to the Local Government Board, seconded the resolution, and said that those who, of whatever country, gave their lives to the promotion of sanitary science as a profession, were particularly grateful to his Royal Highness for his presence on this occasion. They would feel encouraged mutually, and might go forward trusting to make the Congress an epoch in the progress of sanitary medicine and of human welfare.

The resolution was carried by acclamation.

The Prince of WALES, who was again heartily cheered on rising to respond, said—Ladies and Gentlemen,—If I have to undergo the ordeal of returning thanks for the proposal which has just been made to you, that ordeal has been rendered a very pleasant one by the very kind terms in which my old and valued friend, Sir James Paget, has been good enough to make it. To you I also return my most sincere acknowledgments for the hearty and unanimous way in which you have received it. We have all heard with the deepest interest the addresses which have fallen from the lips of those distinguished foreign delegates who have addressed us to-day. Those who are familiar with the languages in which they have spoken could not but have been deeply impressed with what they said. It would be superfluous in me to hark back in any way with reference to the subjects before the Congress, and to allude further to what I have had the honour of saying to you, and what I have heard from the lips of such able men; but most heartily do I congratulate the Congress on the large attendance to-day, which augurs well for the work that is before it. Though the time before the delegates is not long, we have every reason to be very grateful to those distinguished men who have come from different countries of the world to be with us to-day, and who intend to give us their valuable assistance during the work of the Congress. I feel but little doubt, though the outside public may occasionally sneer at the word “Congress,” that if by the interchange of ideas between ourselves and our foreign friends on the matters of importance which have to be discussed, we can only arrive at a just conclusion, we may benefit not only our own country and our own cities but other countries and other cities by pressing forward such sanitary measures as shall decrease disease throughout the world. In that case we shall, indeed, not have lost time in the work we are going through this week.

This concluded the proceedings.

During the week great activity prevailed in

all of the ten Sections into which the Congress was divided, viz.:—1. Preventive Medicine; 2. Bacteriology; 3. Relation of the Diseases of Animals to those of Man; 4. Hygiene of Infancy and Childhood; 5. Chemistry and Physics in relation to Hygiene; 6. Architecture in relation to Hygiene; 7. Engineering in relation to Hygiene; 8. Naval and Military Hygiene; 9. State Hygiene; 10. Demography. Many of the addresses given and papers read will be found in our present issue, and others of equal value will be published in future numbers.\* The great strength of the foreign element may be judged when we state that one of our staff, having occasion, on one particular day, to visit all of the Sections in search of a member, observed that in five out of the ten the speakers at the moment of his entry were addressing the audience in either French or German, these two languages being permissible as well as English.

Outside of the walls of Burlington House and the London University, where the first-named nine Sections held their meetings, the Demographic Section having to find a location at the School of Mines in Jermyn Street, much activity also prevailed; and however strong the scientific attractions were, still the members made time for numerous social gatherings and visits to places of interest, including dinners at the College of Physicians, Crystal Palace, and Holborn Restaurant; conversaziones at the College of Surgeons, College of Physicians, the Guildhall, and the South Kensington Museum; garden parties and other entertainments given by the Baroness Burdett-Coutts, Lord Wantage, Sir Spencer Wells, Sir Edwin Saunders, Dr. G. Buchanan, and Dr. Down; visits to the Thames Ironworks, Wormwood Scrubs Prison, the Beckton Gasworks, and Barking Sewage Out-

\* We take this opportunity to thank those of our fellow-members who have spontaneously forwarded copies of their papers to us, and to request others who desire early publication *in extenso* to send their communications without delay.

fall, Ealing, and Chelsea, where new processes of refuse disposal and utilisation were exhibited to the members. On Saturday, August 15th, owing to the meetings of sections closing on Friday, the excursions were more numerous than on previous days, viz.—to Cambridge, at which University the honorary degrees of doctor of laws has been conferred upon five distinguished foreign members of the Congress—Dr. Brouardel (Paris), Dr. von Inama-Sterneg (Vienna), Dr. von Esmarch (Kiel), Dr. Corradi (Pavia), and Dr. von Fodor (Budapest); Bournemouth, Windsor, Gravesend (annual meeting of Sanitary Inspectors), Netley Hospital, Rickmansworth (to inspect the pumping stations at that place and Springwell), Birmingham, and Wolverhampton.

The Congress was formally brought to a conclusion on Monday, August 17th, when a general meeting was held at the University of London, Sir Douglas Galton in the chair. Sir Douglas congratulated the members on the great success which the Congress had achieved, and stated that the attendance was larger than at any previous gathering of the kind. Speaking of demography and the difficulty of drawing a line between it and hygiene, Sir Douglas gave a definition of the former. "It does not mean bare statistics. It includes health conditions appertaining to industrial occupations and school life. But these questions are also associated with hygiene, and many branches of them come within both sections." From what we gathered during the Congress concerning the opinions of British members, the term Demography, as well as setting apart a special section for it, met with but little favour in their eyes. Indeed, Dr. W. Ogle, in seconding the recommendation that the next Congress should be held at Budapest, elicited considerable laughter and applause by characterising "demography" as an uncouth word. Amongst foreign delegates, who were habituated to the term, the case is different; and one of these, Dr. Korcsi, of Budapest, has offered a

prize of 1,500 francs, to be awarded at the next Congress (which will be held at Budapest in 1894), for the best work on Demography.

After the resolution as to the next meeting had been carried unanimously, the rest of the time—some two hours—was occupied in moving, carrying, and acknowledging numerous votes of well-deserved thanks to the honorary officers and committees.

### PREVENTIVE MEDICINE.

By SIR JOSEPH FAYRER, K.C.S.I., M.D.\*

MY first duty on occupying this seat is to make fitting acknowledgment of the honour which has been conferred on me, and to assure those to who I am indebted for it that, as I appreciate the distinction highly, so, with the aid of my colleagues in this section and the support of the many eminent men of science who will take part in its work, I hope to discharge faithfully the important trust reposed in me.

My next and most agreeable duty is to offer to all who honour us with their presence, or who propose by co-operation to forward the objects of the Congress, a most hearty welcome and cordial recognition of the interest in it manifested by their presence; to express a hope that the deliberations and utterances which result from their wisdom and experience may advance our knowledge, and tend to enhance the welfare of the human race.

This hope is based upon the universal recognition of the need of and capacity for improvement in the conditions upon which physical well-being, immunity from disease, and prolongation of life depend; and this is evinced by the assembling together in this Congress of men of science from all parts of the world, who have devoted themselves to the great international, humanitarian purpose of ameliorating

\* The Presidential Address delivered in the Section on Preventive Medicine at the Seventh International Congress of Hygiene.

the conditions of mankind everywhere, so far at least as the application of the laws of health, and, to some extent, those of sociology, can effect this consummation.

To all, then, we in this great City, who are interested in the progress of hygiene and demography, offer our cordial greeting, and express an earnest desire that our visitors may derive pleasure and benefit from their sojourn in London, and from the proceedings of the great assembly of which they form so important a part.

Before I invite Dr. Cunningham to open the first subject for discussion, it is right that I should make a few preliminary remarks on the general scope and objects of the work comprised in this section. I do not intend to occupy much of the short and valuable time at our disposal by discussing any special subject or by anticipating that which those who follow me may have to say, but shall confine myself to a brief notice of the present aspects of Preventive Medicine, its recent development, how much it has operated and is now operating for the public good, how slowly but surely it is dispelling the cloud of ignorance and prejudice which has overshadowed and impeded the progress of sanitation, and how it is gradually imbuing the public mind with the conviction that prevention is better and often easier than cure, that health may be preserved, disease avoided, and life prolonged by the study and observance of certain well-known laws, which, correlating the individual with his surroundings, determine his well-being when conformed to, deteriorate or prevent it when neglected, and should enforce the maxim "venienti occurrite morbo."

Unprecedented progress in human knowledge characterises the present century, and has not been wanting in preventive medicine; it is, however, during the last half of it that advance has been most remarkable, whilst it is in a later part of that period that it has so established itself in the popular mind as to have passed

from the region of doubt and speculation into that of certainty.

It is now pretty generally understood that about one-fourth of all the mortality in England is caused by preventable disease, that the death-rate of large communities may be reduced much below that at which it has been wont to stand, the average duration of life may be made to approximate nearer to the allotted four score, and that the conditions of living may be greatly ameliorated. The chief obstacles to improvement have been ignorance and want of belief; a better knowledge of the laws of life and health, a more rational comprehension of the nature and causes of diseases, are gradually but surely entailing improvement in the conditions of living and in the value of life, and the diminution and mitigation, if not extinction, of morbid conditions which have in past times proved so injurious or destructive to life. In short, as Dante says:—

"Se'l mondo laggiù ponesse mente  
Al fondamento che natura pone,  
Seguendo lui avria buona la gente."

Paradiso, viii, 142.

Such are the subjects contemplated in the work of this section, and, as far as time permits, the most interesting of them will be discussed. Those selected are of great importance in their relations to public health; let us hope that observers who have formed their opinions from experience in other countries and under different circumstances may throw new light on them.

In the brief space of time at my disposal, it would be impossible to give a continuous outline of the progress of Preventive Medicine during the past, or to trace its growth and development out of ignorance and superstition to its present well established foundation on a scientific basis. It is of happy augury for mankind that the subject of public health is now fairly grasped by popular sentiment, and that, though ignorance, opposition, and vested interest still contest the ground, progress is sure, and the light of science is illuminating the dark places. It is now better appreciated than it

ever has been, that the causes which induce disease and shorten life are greatly under our own control, and that we have it in our power to restrain and diminish them, and to remove that which has been called "the self-imposed curse of dying before the prime of life."

It is indeed only recently that the resources of medical science have been specially devoted to the prevention as distinguished from the cure of disease, and how far successfully, I hope in a few words to show, whilst I trust the proceedings of the various sections of this Congress will indicate how much remains to be done.

Did time permit, I might illustrate the progress of Preventive Medicine by contrasting the state of England with its population of more than 29,000,000 during the Victorian, with the England of the Elizabethan age with its 4,000,000. I might remind you of the frightful epidemics which had devastated the land in the forms of black death, sweating sickness, plague, petechial typhus, eruptive fevers, small pox, influenza, and other diseases, such as leprosy, scurvy, malarial fever, dysentery, &c., of the wretched mode of living, bad and insufficient food, filthy dwellings, and ill-built towns and villages, with a country uncultivated and covered with marshes and stagnant water (according to Defoe one fifteenth part of England consisted of standing lakes, stagnant water and moist places, the land unreclaimed, and with the chill damp of marsh fever pervading all). The homes of the people were wooden or mud houses, small and dirty, without drainage or ventilation, the floors of earth covered with straw or rushes, which remained saturated with filth and emitting noxious miasmata. The streets were narrow and unpaved, with no drains but stagnant gutters and open cesspools, while the food was principally salted meat with little or no vegetable. To this may be added a large amount of intemperance and debauchery. As it is, I can only just allude to them.

In such conditions disease found a congenial nidus, and by a process of evolution assumed the

various epidemic forms which proved so destructive to life. Some of these have gone, let us hope never to return, and the conditions which fostered, if they did not cause them, have gone also. Can we venture to hope that it will be the same with those that remain? Our immunity during the last diffusion of cholera gives some ground for thinking it may be so, if, indeed, the legislature and popular intelligence should be of accord on the subject.

If we turn to the present, we find that great improvements have gradually been made in the mode of living; the houses are better constructed, the drainage and ventilation are more complete, the land is better cultivated, and the subsoil better drained; marsh fever and dysentery, at one period so rife, are unknown, and leprosy has long since disappeared. The death rate is considerably reduced, and the expectancy of life enhanced. Water is purer, food is more varied and nutritious, clothing is better adapted to the climate, the noxious character of many occupations has been mitigated, and the mental, moral, and physical aspects of the people altogether improved; education is general, a better form of government prevails, and the social conditions are far in advance of what they have been; but still the state of our cities show that improvement is demanded, and one object of this Congress is to point out why and how this may be effected, not only in this country, but throughout the world.

If we inquire into the effects of certain well-known diseases, we find that they are less severe in their incidence, if not less frequent in their recurrence.

With regard to small-pox, since the passing of the first Vaccination Act in 1840, the death-rate has diminished from 57.2 to 6.5 per 100,000 for 1880-84, though for the five years 1870-74, it was 42.7, thus showing that there was still much to be learnt about vaccination.\*

\* About this period there was considerable neglect of the Vaccination laws, and laxity in carrying them out.—ED. HYGIENE.

Enteric fever was not separated from typhus before 1869, but since then the death-rate has decreased from 0·39 to 0·17 per 1,000, and it has been shown that this improvement was synchronous in different parts of England with the construction of proper drains.

The diminution in the death-rate from typhus is quite as striking, and this also is shown to have run parallel with improved sanitation in more than one large town.

The death-rate from scarlatina fluctuated between 97 and 72 per 100,000 between the years 1851 and 1880, and though it has diminished considerably of late years (17 per 100,000 in 1886), a corresponding increase in the death-rate from diphtheria has taken place; this may be due in part to a better differentiation of the two diseases.

In 1858 it was reported that phthisis killed annually more than 50,000 people; the death-rate from this disease has not decreased very much for England and Wales, but it has done so in some large towns, notably in Liverpool, and Dr. Buchanan, and Dr. Bowditch of Massachusetts, both showed a striking parallelism between the diminution of the death-rate from this cause and the drying of the soil resulting from the construction of sewerage works.

Cholera first appeared in England in 1831, and there were epidemics of it in 1848-49, 1853-54, and 1865-66, but the number of deaths diminished each time it appeared, and though it has been present since, it has never reached the height of an epidemic. This is fairly attributable to local sanitary rather than to coercive measures.

Preventable disease still kills yearly about 125,000, and considering the large number of cases for every death, it has been calculated that  $78\frac{1}{4}$  millions of days of labour are lost annually, which means £7,750,000 per annum; this does not include the days lost by the exhaustion so often induced by the still too numerous unhealthy houses of the poor.

Towns, villages, and houses are still built in an insanitary way; the death-rate is still higher and the expectancy of life lower than it should be, and though we have got rid of the terrible plagues of the Middle Ages, yet in this century, now closing, other epidemics have made their appearance; cholera has four times visited us; fevers, eruptive diseases, and diphtheria have prevailed; influenza has appeared several times, even recently, and after leaving us last year only to return with renewed virulence, caused in the United States a mortality almost equal to that of the Plague.

Much has been done, and a great deal of it in what is called the pre-sanitary age, but much remains to be effected; let us hope that the future may be more prolific of improvement than the past; international philanthropy seems to say it shall be so.

That we can exterminate zymotic disease altogether is not to be expected, but there cannot be a doubt that we may diminish its incidence, and though we may never be able to reach the "*fons et origo mali*," yet we can make the soil upon which its seed is sown so inhospitable as to render it sterile.

The scope and objects of preventive medicine are not limited to the removing of conditions which give rise to zymotic disease, nor even of those which compromise otherwise the physical welfare of mankind, but should extend as well to a consideration of the best means of controlling or obviating those which, attending the strain and struggle for existence, involve over-competition in various occupations, whether political, professional, or mercantile, by which wealth or fame is acquired or even a bare livelihood is obtained, and under the pressure of which so many succumb, if not from complete mental alienation, from breakdown and exhaustion of the nervous system, which give rise to many forms of neurotic disease, and add largely to the numbers of those laid aside and rendered unfitted to take their due share in the natural and inevitable struggle for existence.

Cr I might point to the recrudescence of those psychical phenomena manifested by the so-called hypnotism or Braidism—morbid conditions arising out of the influence of one mind upon another; this is a subject which demands not only further investigation, but great precaution as to its application, and claims the watchful notice of preventive medicine on account of the dangerous consequences which may ensue from it.

Again, the abuse of alcohol, opium, chloral, and other stimulants and narcotics, and the evil consequences which may result therefrom, is also a subject worthy of consideration, and will no doubt receive it in a communication which is to be brought before this section.

The possible deleterious influence of mistaken notions of education, as evinced in the over-pressure which is exercised upon the young, the predominance of examinations, their increasing multiplication and severity, and the encouragement of the idea that they are the best test of knowledge, whilst true mental culture is in danger of being neglected, and physical training, if not ignored, left so much to individual inclination. This is another subject which demands the jealous scrutiny of preventive medicine, whose duty it is to safeguard the human race from all avoidable causes of either physical or mental disease.

Though preventive medicine in some form has been practised since the days of Moses, yet it has received but little recognition until a comparatively recent period; when science developed and observation extended, medical men and others became impressed with the influence of certain conditions in producing disease, and thus it was forced upon the public conscience that something must be done; and when philanthropists like John Howard devoted life and property to the amelioration of such awful conditions as existed, *e.g.*, in our jails, where the prisoners not only died of putrid fever, but actually infected the judges before whom they

came reeking with the contagion of the prisons, rude sanitary measures gradually came into operation, and partially obviated these evil conditions, but it was not before the middle of this century that any scientific progress was made; it was when Chadwick, Parkes, and others initiated the work by which they have earned the lasting gratitude of the human race that preventive medicine became a distinct branch of medical science.

The sanitary conditions of towns and communities is not dependent on the views or exertions of individuals alone, for they are and have been for the last fifty years largely cared for by the Legislature, and a variety of Acts have been passed which deal with questions concerning the public health; indeed, were all the provisions enforced, little would remain to be desired on the part of the executive Government, but as many of them are permissive, not compulsory, the benefit is less complete than it might be. The old difficulty of prejudice combined with ignorance still too often stands in the way, and, despite much evidence which on any other subject would be conclusive, the most obvious sanitary requirements are often ignored or neglected. Many thousands of lives have been saved by the sanitary Acts now in force; but there is little doubt that more thorough organisation under State control, as under a Minister of Public Health, would have most beneficial results, and would save a great many more.

We must acknowledge, however, that we are much indebted to the action of the Government Local Board, under whose able administration the most crying evils are gradually being rectified. Through the wise precautions enacted by it against the importation and diffusion of epidemic disease, when other parts of Europe were affected by cholera this country escaped, or so nearly so as to suggest that it was to sanitary measures we owed our immunity.

That there is something in the nature of

epidemics which brings them under the dominion of a common law as to their extension seems certain ; that there is much about them we do not yet grasp is equally true, but it is as surely the case that local sanitation is the preventive remedy, as it is that coercive measures to arrest their progress are unavailing.

Under the improved system of sanitary administration, which now obtains and is gradually developing to a greater state of perfection, the sanitary administration of every district in the country is entrusted to the care of duly qualified health officers, a system from which excellent results have already accrued, and from which better still may be anticipated.

The records of the past fifty years prove the influence exerted by sanitary measures on vital statistics.

The first reliable tables from which the expectancy of life may be derived show that in 1838 to 1854 it was for males 39.91, for females 41.85 years ; by the tables of 1871 to 1880 it had increased to 41.35 for males, and 44.66 for females. It is shown also that the expectation of life increases every year up to the fourth year, and decreases after that age. For males up to 19 years it is higher by the old table ; for females it is greater by the new table up to 45, but after that age it is less.

The improved sanitation saves more children's lives, but the conditions of gaining a living are harder than they were at the time of the first table, which accounts for the expectancy of life for adult men being less. Women remain more at home where the better sanitation tells, and are not subject to quite the same conditions as men, so that their expectancy of life is greater than by the old tables up to the age of 45.

A further proof of the effects of sanitary work is a decreased death-rate. Let us compare the death-rates of England during the past times with the present ; whether they be equally significant for other countries I cannot say, but these at all events sufficiently prove the point in question.

## DEATH-RATE.

1660-79	...	...	...	80	per 1,000.
1681-90	...	...	...	42.1	"
1746-55	...	...	...	35.5	"
1846-55	...	...	...	24.9	"
1866-70	...	...	...	22.4	"
1870-75	...	...	...	20.9	"
1875-80	...	...	...	20.0	"
1880-85	...	...	...	19.3	"
1885-88	...	...	...	18.7	"
1889	...	...	...	17.85	"

In some parts of England, where the main object is the recovery or maintenance of health, the death-rate is down to 9 per 1,000, while in others, where the main object is manufacture and money-making, it is as high as 30 per 1,000.

Nowhere, I think, have the beneficial results of sanitary work been better illustrated than in India during the past thirty years. A Royal Commission was appointed after the Crimean war to enquire into the sanitary condition of the British army, and this in 1859 was extended to India. The European army was the special subject of it, but the native troops were referred to incidentally. Here the inquiry had to deal with a large body of men, concerning whom, their conditions of existence being well known, reliable information was accessible. It was ascertained that up to that time the annual death-rate over a long period had stood at 69 per 1,000. The enquiry resulted in certain changes and improvements in the housing, clothing, food, and occupation of the soldier. Since these have been carried out, there has been a steady decline in the death-rate, and the annual reports of the Sanitary Commissioners to the Government of India give the rates as :—

1883	...	...	...	15.18	per 1,000
1887	...	...	...	14.20	"
1888	...	...	...	14.84	"

During some years it has been even lower, down to 10 per 1,000, whilst the general efficiency of the troops has increased. It is not easy to estimate the money equivalent of this, but if we take the rough standard which values each soldier at £100, a simple calculation will show how great is the gain, and who can estimate the value of lives saved and suffering avoided ?

As to native soldiers, with whom the European troops may be compared, I find that the death-rate was—

in 1886	...	...	13.27	per 1,000
in 1887	...	...	11.68	"
in 1888	...	...	12.81	"

Famine, cholera, and other epidemic visitations in some years disturb the regularity of the death rate; under less favourable conditions of living, as in the case of prisoners in the jails, it is somewhat higher.

In the Indian jails, for example, it was—

in 1886	...	...	31.85
in 1887	...	...	34.15
in 1888	...	...	35.57

On the whole this indicates improvement, and as regards the civil population progress also is being made; but here, from so many disturbing causes, the figures are neither so easily obtained nor so reliable. The comparatively large mortality is due to neglect of the common sanitary laws added to extremes of climate, which favour the incidence and diffusion of epidemic disease, and intensify it when it has once appeared.

A Sanitary Department has existed in India since 1866, and every effort is made by Government, at no small cost, to give effect to sanitary laws; there can be little doubt that the results so far, are good, that disease generally is diminishing, and that life is of longer duration.

An important result of the observations of the able medical officers of the Sanitary Service of India has been to show that cholera is to be prevented or diminished by sanitary proceedings alone, and that all coercive measures of quarantine or forcible isolation are futile and hurtful. Here I may say that, large as may appear the death-rate from cholera in India (*i.e.*, in 1888, 1.99 per 1,000 for the European army, and 1.35 for the civil population), it is small compared with that of fevers, which caused, in 1888, 4.48 per 1,000 in the European army, and 17.09 in the civil population; but there is every reason to believe that these also are becoming less fatal under the influence of sanitary measures.

In preventive as in curative medicine, knowledge of causation is essential. It is obvious that any rational system of proceeding must have this for its basis. A certain empirical knowledge may be useful as a guide, but no real advance can be expected without the exactitude which results from careful scientific observation and induction; the spirit of experimental research, however, is now dominant, and progress is inevitable. How much we owe to it is already well known, whilst, under its guidance, the reproach of uncertainty which attaches to medicine as a science is disappearing. Recent advances in physiology, chemistry, histology, and pharmacology have done much to throw light on the nature and causes of, and also on the means of preventing or of dealing with, disease.

It is impossible to exaggerate the value of the scientific researches which have led to the antiseptic methods of preventing the morbific action of micro-organic life, whether the toxic effects produced by them, or those induced autogenetically in the individual. Theory has here been closely followed by its practical application in prevention and treatment of disease, whilst the study of bacteriology, which is of such remarkable pre-eminence at the present time, is opening out sources from which may flow results of incalculable importance in their bearing on life and health. That the conclusions arrived at are always to be depended on I doubt, and it seems that scientific zeal may perhaps sometimes outrun discretion. Is it too much to recall the caution uttered by Dante, to beware of

Immagini di ben seguendo false  
Che nulla promission rendono intera.

Purgatorio, xxx., 131.

That it might be wiser to postpone generalisation has, I think, been more than once apparent, whilst the expediency of further investigation before arriving at conclusions which may subsequently prove to be erroneous, should not be lost sight of; but it has probably

ever been so in the course of scientific progress, that in the enthusiasm of research, which is rewarded by such brilliant results, early generalisation has too often been followed by disappointment, and it may be by temporary discouragement of hopes which seemed so promising.

It would be well to bear in mind a caution recently given by the Duke of Argyll, "that we should be awake to the retarding effect of a superstitious dependence on the authority of great men, and to the constant liability of even the greatest observers to found fallacious generalisations on a few selected facts."\* Still it is in the region of scientific research by experiment that we look for real progress, and we can only deplore the mistaken sentiment, the false estimate, and the misconstruction of its aspirations and purposes, which have placed an embargo on experiment on living animals, rendering the pursuit of knowledge in this direction well-nigh impossible if not criminal ; whilst for any other purpose, whether of food, clothing, ornament, or sport, a thousand-fold the pain may be inflicted without question. The inconsistency of the sentiment which finds unwarrantable suffering in an operation performed on a rabbit, when the object is to preserve human or animal life, or prevent suffering, but which raises no objection to the same animal being slowly tortured to death in a trap or hunted and worried by a dog needs no comment ; whilst the spirit which withholds from the man of science what it readily concedes to the hunter, is, to say the least, as much to be regretted as it is to be deprecated.

It must be remembered that, important as are the researches into microbiology, there are other factors to reckon with before we can hope to gain a knowledge of the ultimate causation of disease. It is not by any one path, however closely or carefully it may be followed, that we shall arrive at a full comprehension of all that

is concerned in its etiology and prevention, for there are many conditions, dynamical and material, around and within us which have to be considered in their mutual relations and bearings before we can hope to do so ; still, I believe we may feel satisfied that the causes of disease are now being more thoroughly sought out than they ever have been—all honour to those who are prosecuting the research so vigorously—and that though individual predilection may seem sometimes to dwell too exclusively on specific objects, yet the tendency is to investigate everything that bears upon the subject, and to emphasise all that is implied in the aphorism, "*Salus populi, suprema lex.*"

## THE RELATION BETWEEN CHEMISTRY PHYSICS, AND HYGIENE.\*

By SIR HENRY ROSCOE, M.P., F.R.S.

THE branch of the great subject of hygiene with which we in this section have to deal, viz., that of the relation in which it stands to the sciences of chemistry and physics, is one of primary importance and interest. Indeed, taken in its most general sense, the relation of the science of health to chemistry and physics will be found to include almost all the varied subjects which come under the cognisance of this Congress, for all vital processes are regulated by chemical and physical laws, and physiology may be defined as the chemistry and physics of the animal body. Hence the preservation of a normal condition, or of health, being dependent upon these laws, it is clear that our section is the most important of all, for it is by obeying chemical and physical laws that health is maintained, whilst by neglecting to follow them we court disease and death.

But whilst as chemists and physicists we may claim credit for laying the foundations of the

\* The presidential address delivered in the section of chemistry and physics, at the International Congress of Hygiene.

edifice of hygienic science, we gladly admit that portions of the building have been raised by other hands, and heartily do we welcome the successful efforts which the biologist, the physician, the engineer, and the statesman have made to help us to complete the building up of a condition of things by which the amount of preventable disease is reduced to its possible minimum, and that of health and well-being increased to the maximum possible under the necessary circumstances of our lives.

As to the progress which during the last half century has been made towards the attainment of this end—he who runs may read. Those who can carry their minds back fifty years will be free to confess that, at that time, whether in England or abroad, the principles of sanitary science were recognised only by a very few men of “light and leading,” and that any attempt to carry out these principles were, indeed, few and far between. Fifty years ago our notions of the nature of contagion, of the causes which lead to the spread of epidemic diseases were of the crudest and vaguest description. We then had no idea of the fact, now not only proved beyond doubt, but strongly impressed on the public mind, that both water and milk are fertile carriers of disease if contaminated even ever so slightly with infectious material.

In those days “pump” water was believed to be wholesome if only it were cool and sparkling, and water from a source now recognised as dangerously impure was preferred to the pure article which came from a distance in the city mains. Now the sanitary authority closes all doubtful wells, and municipalities incur vast expense in bringing home to everyone a pure supply of this necessity of life. Still much remains to be done for an adequate supply—especially in rural districts where the village pump is too often the sole source of supply, and where that pump is not infrequently in close proximity to sources of dangerous impurity. Moreover, even where the supply is of good quality its quantity often fails in dry

seasons from lack of any impounding system of the flood waters. That fifty years since our knowledge of these matters was limited is due to the fact that in those days chemists were unable to decide whether a water was harmless or dangerous. The methods of analysis were then crude and insufficient; and even now, when these methods have been greatly improved, the most expert analysts may find themselves in disagreement, on a mere chemical examination, as to whether a given water is fit to drink or not.

Fifty years since no one realised that the existence of cesspools under their houses, of which there were then thousands in London, was a source of danger to the inhabitants. The idea of getting rid of and of utilising foecal matter was laid hold of ages ago by nations, such as the Chinese, whom we in our wisdom term barbarians, whilst the civilised European waited till the middle of the nineteenth century before he discovered that if he would preserve his life he must remove from his neighbourhood the refuse which accompanies that life, and even now, at the end of the century, he is far from having solved the question of the best way of its removal, much less that of its utilisation.

The question of air pollution, which will come on for discussion during our sittings, is a much more difficult, though an equally important one. We can bring pure water into our houses by pipes, we can also take away the polluted water by sewers, we can see the fresh water running in, and we know, if our drains are in order—an assumption, it is true, and perhaps a bold one—that our dirty water at least goes away from us. In the case of the air we cannot regulate the fresh supply so easily; nature, indeed, does much for us; in fact, if she did not, we should be badly off. We cannot see the air, whether pure or otherwise. Our sense of smell may, if it be sensitive—which is again an assumption often incorrect—possibly tell us that something is wrong, though it by

no means follows that an odourless air is pure stoppage of the escapes which formerly occurred, and healthy; but to ascertain how far the air is impure, and to express it in figures was, so far as concerns many of the most important of these impurities, impossible fifty years ago, and is only now beginning to be understood. But even were we able to detect the presence in the air of the spores of the as yet undetected influenza microbe we should be far from having a means of freeing the air from it. By filtration through cotton wool air can be obtained practically free from microbes, as well as from dust particles and fog. But such air filtration can only be adopted in a very limited number of cases, and is altogether useless for general purposes. One of those few instances is that of the House of Commons, where a system of air filtration has been successfully adopted, by which the air of the debating chamber has been preserved perfectly free from fog, as well as from microbes, if the doors are kept closed.

The discussion on town fogs and their prevention, will enable us at any rate to form an idea of the causes and possible mode of preventing these serious drawbacks to a city life. A scientific inquiry, if it does not at once succeed in finding a cure for the evil, may at least point the way to prevention, and I shall be surprised if we do not find that the ultimate panacea will consist in using gaseous fuel and the electric light.

Another source of air pollution, more easy to grapple with, lies in the escape of deleterious gases from chemical works and other manufacturers. The removal of many causes of such pollution has been satisfactorily accomplished in this country under what are known as the Alkali Acts, or more properly the Noxious Vapours Acts. Thanks to the care with which these Acts have been worked, both by the Government inspectors and the manufacturers themselves, the serious complaints which arose of nuisance due to the escape of acid and other noxious vapours are now no longer heard; and not only has the public been the gainer by the

but the manufacturers themselves have also benefited, inasmuch as they have had their attention directed to improvements in their processes which have proved remunerative.

The great smoke question is one upon which I hope some light will be thrown by the discussion, which will take place during our meeting. Much, doubtless, can be done in preventing the output of smoke from factories and other places in which large quantities of coal are burnt, but, after all, the smoky atmosphere of our towns is caused chiefly by the thousands of domestic fires, and at once to alter these so as to prevent smoke, or to insist upon gaseous fuel being generally used instead of coal, is to expect the impossible.

I have said that the foundation of hygienic progress is to be sought in the application of chemical and physical principles. This is true not only of the matters of every day experience to which I have already referred, but also of the most recent and astounding discoveries, showing the dependence of the health of the community on the actions of microbic life. Thus Pasteur and his pupils have proved that these actions on the host or body receiving the microbes as guests, are to be attributed rather to definite chemical products formed by the living micro-organisms than to the organisms themselves. For just as in the well-known instance of the vinous fermentation, the products of the action of the yeast plant on sugar are alcohol, carbonic acid, and subsidiary compounds, so each definite micro-organism—such, for example, as that peculiar to diphtheritis—engenders certain active chemical principles which are capable of effecting serious or fatal changes, characteristic of this disease, within the animal body. Hence the ultimate causes of epidemic disease rest upon a chemical basis, and as we find in a simple chemical an antidote for poisoning by any of the commoner chemical poisons, so it would appear that an antidote for hydrophobia, for example, is to be found in the complicated chemical pro-

ducts of the life of the micro-coccus characteristic of this disease. How these antidotes—except in the most simple cases, such as acid and alkali and the like—act is as yet unknown. We do, however, know that the growth and life functions of this yeast plant are stopped in presence of an excess of the poison, alcohol, which it secretes, and this fact may help us to explain, to some extent, the protective action exerted by the chemical poison developed by many pathogenic micro-organisms. The elucidation of this subject, all important for the health of the community as well as of the individual, is one of the most pressing scientific needs of the day. To isolate the various chemical products, to study their actions, both chemically and pathologically, is a necessary step towards the attainment of the end which we all have in view, viz., the prevention and cure of disease. Hence, it will be admitted by all, that whilst the determination of the morphological characters of micro-organic life is an essential preliminary, it is to the examination of the life-functions of the organism, and especially to those connected with the production of its peculiar chemical poison, that we must look for the complete solution of the problem; and therefore it is in the laboratory of the chemist, and by the application of chemical and physical methods of research, that progress in these matters will in the coming time be made. So again, I say that the foundations of hygienic progress are to be sought in the application of the principles of chemistry and physics.

And now, gentlemen, I know that all well-wishers to this progress, whether the English members or the foreign guests who have honoured the Congress by their presence, will rejoice to learn that we in England, determined no longer to lag behind our Continental friends, are about to establish a National Institute of Preventive Medicine, in which not only researches of the kind I have alluded to can be satisfactorily carried out, but where instruction in the numer-

ous special branches of science, upon which the health of the nation depends, can be given. Those who have interested themselves in this movement feel that it is no less than a national disgrace, that whilst almost every other civilized nation has established an institute of the kind in its midst, we in England should stand alone inactive and supine. We believe that the necessity for such a national institute only requires to be made generally known to be universally acknowledged, and we feel confident that now, having obtained the first step towards the attainment of our object, viz., recognition under license of the Board of Trade, the Council of the Institute will only have to ask in order to obtain the considerable amount of pecuniary support necessary for carrying on the work of the Institute on a scale worthy of the country. The support must come wholly from private sources; for our Government, unlike that of many other countries, as yet holds aloof from supporting institutes of this kind however necessary they may be to the general well-being of the country. The time may not be far distant when different views will prevail, and when Parliament will consider it one of the first and most binding duties to support by Imperial grant an institution whose sole aim is that of increasing our knowledge of the conditions upon which the health of the nation ultimately depends and of diffusing that knowledge widely throughout the land.

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### SOME INSANITARY SUPERSTITIONS IN HOUSE BUILDING.

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By H. H. STATHAM, F.R.I.B.A.

THE remarks in this paper refer more especially to houses built in large and crowded cities. Houses built in open situations in the country are permeated by an atmosphere comparatively pure and clean. Houses in large towns are permeated by an atmosphere laden with impurities, which are continually being de-

posited on every surface that will retain or absorb them. They are also subject, unless carefully watched, to the incursion of various types of vermin. It is therefore desirable that houses should be constructed of materials the least likely to absorb and retain impurities, and that the method of construction should be such as to leave no unlighted and inaccessible spaces.

The habitual construction of ordinary houses in England is not in accordance with these requirements. For many generations the orthodox manner of making a house-floor has been to lay wooden joists from wall to wall with boards nailed down above, and a lath and plaster ceiling beneath, the space between being an unseen cavern for the accumulation of whatever dirt and decaying matter can find its way in. What the results may be I once saw in the worst form in a case where the boards of an East End schoolroom were taken up to ascertain the condition of the joists. The space between those joists was filled nearly to the top with dirt and dust, over which the children had been daily collected. Such a floor would not be allowed in a modern London Board school, but it is the accepted floor for a dwelling-house; and though the conditions of a well-kept dwelling-house do not encourage such an accumulation as this, I believe the tenants of the best kept London house which has been inhabited for any length of time would be disagreeably surprised at the amount of dirt they would find under their flooring boards if they looked for it. The old-fashioned system of ceiling up to the under side of the flooring boards and leaving the joists visible is far more sanitary; the drawback is that it is unsightly and that it does not shut out sound sufficiently. Double flooring boards with felt between would get over the latter objection to some extent; but what I wish to recommend is the general adoption of solid floors of iron and concrete, with a wood block or plain parquet floor on them, for the average town dwelling house. They are almost necessarily adopted for

houses in flats; why not for every dwelling house?

It has for many generations been the recognised faith that a house roof can only be made by means of rafters laid on the slope with a tie at the foot, and with ceiling joists either at the springing of the roof or part way up the slope. The advantage of this is that the upper rooms which go partly into the roof are rendered inconvenient and unsightly by a low sloping ceiling to half the room, and that above the ceiling joists is a dark cavern between them and the roof, into which no one ever sees, and where dirt may accumulate and vermin may breed undisturbed. It is really an almost alarming thought to reflect what is the probable cubic content of these dark caverns in the roofs of houses over all London. If it be thought necessary to go on building sloping roofs, either the whole slope of the roof should be thrown into the top rooms, as the visible ceiling, or the ceiling of the highest living rooms should be at the level of the roof springing, and the space between that and the rafters should be treated as storage space easily accessible and sufficiently lighted to be readily examined from time to time. But in fact it is entirely unnecessary, in these days of iron, and concrete, and tile, that we should build sloping roofs at all; the doing so is a mere superstition, except where reasons of architectural effect are concerned, and certainly architectural effect does not concern itself much in the ordinary house roof. With flat roofs with a cement finish and sufficient fall to run the rain to the gutters, we should get rid at once of all these dark caverns, the exterior and interior of the roof would coincide in shape, and convenience and healthfulness would be alike consulted.

The whole tribe of things called "skirtings" and "casings" are superstitions of the same kind for providing dark, inaccessible places where no cleansing hand can ever come. Baths and water closet basins are surrounded with those foolish fences of joinery; whitened sepulchres,

which, indeed, appear neat outwardly, but within they are full of—no one knows what, for no one ever looks. Let both water-closet and bath stand be open to inspection all round, instead of being cased in. In the matter of the bath, the money spent on panelled casing and “polished bay wood or mahogany top” would go far to render the bath itself a neat and presentable piece of furniture.

Casings for pipes are, no doubt, necessary, and are generally specified to be screwed on, so as to be removable when required. They never are removed, or the space behind seen, except when something is wrong with a pipe. They should be hinged, and made with button fasteners, so that they can be opened every day without any trouble. Among other drawbacks, they form a private lift or elevator for the cockroach, who is fond of warmth, and is enticed to ascend along the line of the hot-water pipes. The cockroach is bad enough in the kitchen, but a good deal worse in the bedroom; it is hardly worth while to afford him the luxury of a private passage, heated with hot water, to the upper floors.

The passion for sash windows in this country leads to the employment of another system of wooden cradling built up round the windows, with hollow inaccessible boxes for the lines and weights, besides (generally speaking) another set of hollow spaces behind the back of the shutter casings. It is perfectly possible to make sash windows without pulleys and weights in more ways than one, unless when they are very large and heavy. But the casement window has the advantage that it can be hung in solid frames without any of this bandbox work round it, and making it weather-tight is merely a matter of care and scientific construction. It is worth consideration whether we should not do better to return to it as the more wholesome and sensible structure of the two.

Wall paper is a simple and inexpensive means of producing decorative effect in a room, but papers should be close in texture and smooth in

surface. Papers with embossed surfaces, and, above all, what are called “flock” papers, are dust holders, and such wall surfaces cannot be kept properly clean. Coloured plaster, finished with a hard surface, is more sanitary than any paper, considering that the paper has a layer of paste behind it which becomes rotten in time. If, however, papers are renewed often enough, and the plaster stripped and well scoured at each renewal, the insanitary element in them is not of sufficient importance to counterbalance the decorative gain.

Large and deep plaster mouldings and decorations are now, fortunately, going out of fashion on aesthetic grounds; they are injurious to the cleanly condition of a house, affording so many pockets for the lodgment of dirt. As long as they are kept flat and in low relief there is no harm in them. The wooden mouldings with a hollow on the top, which are now much used to take picture-hooks, are objectionable, as the hollow is always full of dust. The old brass picture-rods are much to be preferred in this respect.

Furniture, which is a kind of minor architecture, has its superstitions of construction, the worst of which is the system of finishing large wardrobes, book-cases, etc., with a cornice standing up all round the top, leaving a wide pit for dust, which is never seen, and cannot be swept. This cornice is a mere fashion, utterly useless and absurd. The top should be made level or (still better) sloping, and with no raised ledge above it, so that it can be swept. It is best of all to make large erections of this kind as fixtures, carried up to the ceiling, and finished with a moulding against the ceiling; then there is no place where dust can accumulate.

The last superstition I will mention concerns that important receptacle, the cistern. The cistern should be in a well-lighted place, where it can be easily seen every day. The best way would be to make it as an aquarium tank is made, with a front of plate glass, so that you can see the light through the water.

## SANITATION AFLOAT.

By R. W. COPPINGER, M.D., Fleet Surgeon, R.N.

THE chief difficulty in regard to the provision of suitable accommodation for the crew of a man-of-war consists in the fact that while the vessel must be constructed of manageable dimensions for manœuvring purposes, and is therefore restricted in length, the number of the crew is based upon what is required for the efficient working of the engines, guns, and torpedoes.

In other words, the housing of the crew is apt to be regarded as of secondary importance in the designing of a ship-of-war, as compared with the provision of space for carrying the greatest possible quantity of mechanical fighting material. That this must, to a certain extent, ever be the case, is a fact that has to be accepted by sanitarians; for the primary object of a man-of-war, in fact the object of its existence, is to act as a fighting machine; and the country requires, and the rivalry of other great powers requires, that all other functions be to some extent subordinated to this.

The very limited accommodation available for our crews, with its attendant inconveniences, is not, however, of so much consequence as might at first sight appear to be the case, because future naval actions are likely to differ very materially from those of the past in respect to duration. The terribly destructive action of the three great engines of modern naval warfare, viz., the heavy gun, the ram, and the torpedo, will probably limit the duration of an engagement to a very brief period. Again, owing to the very extensive use of steam propulsion, and the facilities for obtaining information of a vessel's movements afforded by the telegraph wire, vessels will not nowadays require to keep at sea so long as in former times. Hence it is that the evils entailed by a long-continued subjection to insufficient air-space on board ship, will not (as formerly) come into force so as, by lowering the physical efficiency of

our men, to influence materially the issue of a naval action at sea.

The question of air-space and ventilation as applied to men-of-war has always been a difficult problem, and the progress of modern naval architecture, necessitated by altered conditions of warfare, tends in many ways to make its solution more difficult of attainment. Among these conditions may be mentioned (1) the very great amount of air-space occupied by machinery and stores connected with torpedo work, and (2) the introduction of watertight bulkheads. These latter partitions are a great source of difficulty in respect to obtaining a complete circulation of air throughout a ship.

It is of little use to draw comparisons between house ventilation and ship ventilation in regard to the steps to be taken for successfully coping with the latter, because the conditions are widely dissimilar. The contrast must be obvious when one calls to mind the ever varying position of a ship with regard to sunshine and wind, the deflection of air currents caused by the trim of the sails and the consequent interference with uptakes and downtakes, and the number of apertures in the shape of hatchways, ports, and scuttles which have to subserve other purposes besides those of ventilation: all of these rendering somewhat abortive those systems of ventilation (applicable to houses) which depend upon the action of natural forces.

The introduction of the turret and barbette system of construction into our modern battleships, with the consequent reduction and almost complete abolition of apertures for natural ventilation by means of ports and hatchways, has rendered necessary a very general use of artificial ventilation by means of rotary fans, to supplement artificial ventilation by means of funnel and funnel casing.

Since rotary fans driven by steam were first supplied to our ships, opinions have differed as to whether these ventilating appliances should be fitted so as to drive in fresh air or to exhaust the vitiated air. Most of our new

battleships are fitted with "supply" fans only, but in two vessels of recent construction there are fans both for supply and for exhaust; so that in these two vessels provision is made for a complete artificial circulation of air throughout the ship. In a ship which was quite recently launched, "supply" fans only are fitted; so that the impression appears to be gaining ground that where one system only is to be adopted, that by "supply" is preferable.

For my own part I am inclined to adopt the view (which will, I fear, be considered heretical by most sanitarians) that on board modern war vessels the "supply" system of ventilation is preferable to that by "exhaust." If the interior of a vessel were an enclosed space without subdivision into many separate chambers, and if there were but two apertures communicating with this space, then, no doubt, the application of an air exhaust to one aperture would, if maintained long enough, change the air of the entire space by the admission of fresh air through the other opening. But such a style of construction is practically not attainable. Exhaust fans, as at present fitted, are apt by a process of what I may call "short-circuiting" to draw in fresh air largely through the hatchway or ventilating aperture nearest to the first opening in the main trunk of the fan, and, as regards distant portions of the ship, to perform the function of merely shifting foul air from one compartment to another. There is, moreover, a possibility of "exhaust" fans antagonising rather than assisting the action of the "supply" fans.

The distribution of air from a "supply" trunk to various parts of a ship is in another respect attended with considerable difficulty, viz., in regard to regulating the flow of air through lateral perforations or grating apertures. This is owing to the fact that in the air-trunk from a centrifugal "supply" fan, although the velocity be considerable, the pressure is very low. Hence it is that the current of air in passing by one of these openings

tends to set up an aspiratory action on the vitiated air outside, rather than to deliver fresh air. The action I here refer to is similar to what takes place when the wind blowing horizontally over a chimney exerts an aspiratory influence on the air inside the chimney, and thus draws up air from a cold firegrate. To meet this difficulty I would suggest that all the branches from the "supply" air-trunk should be made to enter the trunk for a short distance with the ends inclined towards the air-current; or else guides should be fitted so as to answer the same purpose by diverting the required stream of air.

Of all the methods of artificial "exhaust" ventilation applicable to ships, I am inclined to think that that by means of the funnel and funnel casing is the most satisfactory.

The steam-jet exhaust (Edmonds') is at present used only in troop-ships, and is considered objectionable on account of the noise, the collection of water arising from condensation in the ventilator, and the waste of steam.

A method of extracting foul air by means of the induced draught set up in a ventilating shaft by the emission of compressed air at low tension discharged from a ring-jet is now in contemplation.

The warming of men-of-war (more especially ironclads) in cold weather is a very important matter, not hitherto sufficiently provided for. The usual method at present is by means of bogey fires, a method which is not only troublesome and dirty but is also dangerous, both in regard to the risk of the decks catching fire and the products of combustion causing asphyxia from insufficient outlets for smoke being provided. A better plan would be to have a system of steam pipes disposed throughout the berthing deck, and arranged so as to take steam from the main boiler, furnished, if necessary, with reducing valves so as to maintain a low and uniform pressure.

A greater difficulty is to provide a means of cooling the air between decks in tropical

regions, more especially when the ship is at sea and under steam. It has been suggested that this might be effected by using compressed air, both as a source of motion for ventilating purposes and also as a means of abstracting heat when undergoing expansion while doing work.

In order to facilitate the application of artificial ventilation to the sleeping places on board ship, I would urge that in the construction of our battleships a single space (uncomplicated by bulkheads) should be set apart for the accommodation of the crew. At present the crew, at all events as regards their sleeping billets, are scattered over various parts of the ship. Such a scheme would render it possible to lessen the number of branches and apertures to ventilating shafts, and therefore to concentrate and regulate with more precision the application of ventilating apparatus to that portion of the ship where it is mainly needed. Moreover, if the crew were thus grouped together the task of providing for the maintenance of a suitable temperature would be less difficult.

In turret and barbette ships such a space might perhaps be provided by giving greater capacity for accommodation of the crew in that portion of the ship inside the breastwork; while in other classes of vessels the best position for the accommodation of the crew is under a roomy forecastle. In this latter situation there is little difficulty in obtaining efficient natural ventilation. Such accommodation (viz., in forecastle) is to be found in troopships, and to some extent in war vessels of a certain class.

#### INFLUENCE OF GROUND WATER UPON HEALTH.

By BALDWIN LATIHAM, M.I.C.E., M.I.M.E.,  
F.G.S., F.S.I., F.S.S., P.R.Met.Soc.

THE actual measurements of the ground water in this country, in some cases, go back for a period beyond that of the registration of

death, consequently a comparison can be made between the state of the ground water and the death-rate of any particular period, and when such examination is made it is found that there is a coincidence between the state of the ground water and the deaths recorded. The deaths follow, as a rule, in the inverse ratio, the state of the lowest ground water; that is, *high* low water indicates a healthy period, while *low* low water marks the unhealthy periods. Investigations respecting the influence of ground water upon health should be studied over limited areas, as the distribution of rain is often very local, and there are varieties in the geological character of the soil that affect the result of observations carried on over large areas, and on this account, while observations have been carried on by the author over an extended area, he has always used local observations to compare with the mortality returns in the same district, and he has specially dealt with the records of Croydon, which is the place where the observations as to percolation, evaporation, and the hygrometric condition of the soil have been locally studied.

There is every reason to believe that the ground water itself, except when polluted, exercises no influence as a cause of disease, but it is merely the measure or indicator of the influences which are at work within a polluted soil, and of certain organic changes which evidently take place within the dark recesses of the soil, and which lead to the development of the conditions favourable to a certain class of disease. That the earth does exercise a baneful effect upon health is well known from the experience in this country of the unhealthiness of cellar dwellings, and from the fact that persons habitually living upon ground floors are not so healthy as those living in the upper storeys of buildings removed from the influence of the ground.

There is a seasonable fluctuation in the waters in the ground, and, as a rule, these waters are lowest in the autumn and early winter, and highest in the spring or early summer, but in some years the period of both low and high

water varies, as, for example, the low water of last season did not take place until February of this year (1891).

It is also known that the artificial lowering of the sub-soil waters of a district has produced the same effects upon the health as occur when a general lowering of the ground water arises naturally from drought.

The actual drying of the ground is a condition which is favourable to the general good health in this country, and this circumstance often masks, in the general death-rate, the potential influence of certain diseases, so that the general health of a district appears to be good while at the time it may suffer intensely from a certain class of disease of which low ground water is the indicator. When, however, the conditions become extremely intense, and the ground water exceptionally low, the influences at work affect the death rate as a whole. On the other hand, in periods of excessive rain with high ground water, the conditions are usually favourable to health, and all places in which the ground waters are of a uniform level, such as seaside places, which are governed by the mean tide level, and river valleys with porous soils, like that of the River Wandle, in which the water is headed up to a uniform level by mills, are usually healthy.

It is known that the measure of the effect of the ground water is most marked in districts which draw their water supply from the ground, and among that section of the inhabitants who use such water for dietetic and other purposes, especially in the case of young children and teetotallers.

The unhealthy time after the period of excessive low water is that when the first rain begins to percolate through the soil, just as if it washed out matters which had been specially prepared or were retained in the dark recesses of the soil, into the water, or by driving out the ground air specially charged with the poison of disease. It is by no means uncommon both in this and other countries to find that particular epidemic

outbreaks which have become rife at a low-water period can be traced to particular rainfalls. In this country since we have had registration of deaths, those quarters of the year when percolation has first commenced after periods of exceptionally low water are, without exception the most unhealthy seasons that have been recorded. The quarters of the year when percolation first commenced after exceptionally low water have been the most unhealthy, as, for example, the March quarters of 1838, 1845, 1847, 1853 1855, 1864, 1865, 1866, 1875, 1890, 1891, which, with the exception of the third quarter of 1849 (the cholera year), are the most fatal seasons on record.

There is no doubt that the sanitary condition of the district greatly influences the results of the movements of the ground water, and the greater the amount of disturbance or the number of disturbances of the ground water in the course of the season in insanitary districts, the greater and more marked the influence upon health until the period arrives when the soil has been washed free from its impurities and the waters have accumulated in the ground.

Certain diseases have their allotted seasons and conditions favourable for their development and spread, and there are a number of diseases usually most rife when the ground waters are low, such as enteric fever, cholera, small-pox, diphtheria, and others.

The state of low ground water as being a condition accompanying epidemics of typhoid fever is a matter of constant observation, and it is a well-authenticated fact that all epidemics of this disease in this country have occurred in periods only of low water, or when immediately following a very low state of the ground water. Ground water influences both small-pox and diphtheria in a most marked manner, but in directly opposite ways, so that when one of these diseases is present the other is absent. Small-pox is accompanied or preceded by intense dryness of the ground, while diphtheria occurs only when the condition of the ground is one of con-

tinued dampness. The year 1871 was a very fatal year from small-pox in this country, and in that year the percolation experiments showed that the ground was intensely dry. In 1876 an outbreak of small-pox occurred at Croydon, and continued until the autumn of 1877. Outbreaks of this disease have subsequently occurred in this place in 1881-82 and 1884-85. Since September, 1885, there have been no deaths recorded from small-pox in Croydon, but diphtheria has been very prevalent during the whole of that period, and the ground has been in a constant state of dampness; so much so, that with the exception of one month—October, 1886—a measurable quantity of water flowed from the percolation gauges every month during all this long period. The last outbreak of small-pox in 1884-5 was preceded by seven months, and that of 1881-2 by five months, when no water percolated through the ground. Since the time when the author first observed this marked coincidence between the dryness of the ground and outbreaks of small-pox, he has learned from the report of Surgeon-Major G. Hutcheson, M.D., Sanitary Commissioner of the North-Western Provinces and Oudh, that the counterpart of this has been observed in India in reference to small-pox, which, it is stated, "is controlled or kept in abeyance by damp and moisture."

The most marked incident in connection with ground water is the remarkable parallelism between the deaths of children under five years of age and the lowness of the ground water; in fact, it is found that the deaths in this case fluctuate inversely in proportion to the volume of the water in the ground.

The coincidence between the rates of mortality of children and ground water occurring period after period is tantamount to positive proof that ground water, at least, if not the direct cause, is the measure of the influence at work which seriously menaces the lives of young persons.

## PURE SPRING WATER FOR LONDON.

### VISIT OF MEMBERS OF THE CONGRESS OF HYGIENE TO RICKMANSWORTH AND HAREFIELD.

Of all the numerous excursions arranged for the members during the Congress of Hygiene-week, few could have been equal, and none superior, to that made on the 15th of August, to view the pumping stations on Mr. George Webster's estate, near Rickmansworth, whether regarded from the point of view of public utility, hygienic importance, or the individual enjoyment of the members who availed themselves of Mr. Webster's courteous invitation and genial hospitality.

Down at our Surrey home the early morning indications betokened unfavourable weather. The wind sighed heavily amidst the leafy branches of the tall elms, and ever and anon there was the low rumbling sound of distant thunder, and huge rain-drops dashed against our windows, while all bird-life was stilled, and even the never-tiring swallows ceased their graceful, rapid flight for a time; but, breakfast over, we quoted with an emphasis that gave us fresh courage, the old shepherd's proverb, "Rain before seven, it will be fine before eleven," and made the best of our way to the trysting point, Euston Station, where we found some sixty gentlemen waiting to go down by the special train to Rickmansworth, by the London and North-Western Railway; the party was subsequently increased to nearly a hundred by others, who joined at Watford and at our point of destination. By the time that we reached the latter the clouds had rolled by, the sun shone as it should do in August, and as our fellow-travellers took their seats in the commodious pair-horse wagonettes provided for them, it was evident that they not only meant business, but intended to derive a very ample proportion of pleasure from their trip.

The first halt made was for the purpose of inspecting the two sources situated within a

short distance of Rickmansworth railway-station, the total depth of the bore and well at each being 184 feet, the well being sunk through gravel (30 and 25 feet respectively) to the chalk strata. At each, directly the steam pumps were set in motion, thousands of gallons of splendid, sparkling spring water were brought up from the, comparatively speaking, inexhaustible reservoirs contained in the chalk. As we submitted it to the critical judgment of eye and palate, our memory wandered back instinctively to a similar inspection which we made at the commencement of the present year of a yellowish, repulsive fluid taken from the main of one of the London water companies. That which we drank at Rickmansworth was of the quality which Shakespeare had in his mind's eye when he spoke of "honest water"; that which we tried, in vain, to swallow eight months ago was Thames water, imperfectly filtered, and as impure and nauseous to the taste and smell as it was noxious to the health of all doomed to consume it.

When the inspection of these two pumping stations had been completed we resumed our seats in the carriages, and drove through Rickmansworth, the old-fashioned style of which excited the admiration of some American friends who were of the party, as did also the lovely and varied scenery through which we passed on the way to Springwell, and afterwards thence to Harefield Grove, the residence of our host, Mr. Webster. At Springwell, situated, like the two wells previously visited, in the Colne Valley, two others were inspected, sunk, as at Rickmansworth, through gravel to the solid chalk, the bore-holes, lined with steel tubes so as to prevent any possibility of contamination with surface water, being continued to a depth of nearly 200 and 300 feet respectively. Here the supply of water pumped up as soon as the engines were set in action was much larger than that at Rickmansworth; and as the torrent, sparkling clear as crystal, passed along the large wooden trough by which it was

discharged, forming a miniature cascade, into the adjacent river, there was a general expression of approbation at its appearance and quality, as well as of regret that such a valuable source should be at present absolutely wasted, and lost to London.

We learned from Mr. Claud Monckton, C.E., the able engineer to whom Mr. Webster has entrusted the operations connected with the search for water in the Colne Valley, that the present output would reach 10,000,000 gallons daily, and that by certain improvements this supply could be readily developed into 20,000,000 gallons. The Springwell site is, as we also learned from Mr. Monckton, who readily placed his special and local knowledge at the disposal of any member of the party, 146 feet above sea level (Ordnance datum level), that being much more than 100 feet above the summer level of the Thames at Hampton, from which locality the bulk of the water at present supplied to the Metropolis is obtained. The advantage of this position will at once be seen when the question of supplying London with pure water from Springwell is taken into consideration. By pumping the water to a reservoir, constructed on an adjacent hill 200 feet higher than Springwell, or, in round numbers, some 350 feet above sea level, it would be at such a commanding height above the metropolis that the water could be conveyed by simple gravitation to the top of buildings in all parts; the cross on St. Paul's Cathedral is only 400 feet high. The surface of the chalk stratum, whence an inexhaustible and practically unlimited supply of pure water can be procured,\* is at a depth of 300 feet at Ealing, 250 at Richmond, and 100 at Uxbridge; but to the south of Rickmansworth, at Springwell, for example, it leaves the clay and gravel beds, and rises close to the surface.

\* So minute and numerous are the pores in chalk that a cubic foot of dry chalk will absorb and hold in these pores from two to two and a half gallons of water.

Speaking of the amount of water obtainable from the chalk, it may be mentioned that Mr. J. Grover, C.E., the engineer to the Watford District Water Company, estimates the area of chalk forming this watershed at 234 square miles, and that an average rainfall on this of 26 inches per annum would give a daily supply of 240,000,000 gallons.

Mr. S. C. Homersham, C.E., whose extensive and elaborate researches into this question, as engineer to the proposed London (Watford) Spring Water Company, some forty years ago, make his opinion of great weight and value, exceeded Mr. Grover's estimate.

Robert Stephenson bore similar testimony to the eligibility of the Colne district for the water supply of the metropolis, in two excellent and interesting reports made by him to the directors of a company projected under the title of the London and Westminster Water Company.

Mr. J. Thornhill Harrison, C.E., senior engineering inspector to the Local Government Board, has given it as his opinion that the outcrop of the chalk would suffice for the whole of London.

The quantity of water now required for gross daily consumption in the metropolis is about 170,000,000 gallons, while Mr. Grover's estimate provides 240,000,000 gallons, taking the annual rainfall at 26 inches (an average always far exceeded). Take 1885, for instance—a year in which the monthly average was below the normal standard in seven months out of twelve—the total rainfall amounted to nearly 39 inches.

Before leaving Springwell we may record the historical fact that as long ago as 1640 a proposition was made to Parliament to bring water from the Rickmansworth district to London, taking the supply from the river Colne to a distributing reservoir at St. Giles's-in-the-Fields. Even then, only a quarter of a century after the carrying out of Sir Hugh Myddelton's scheme for bringing water from the Amwell and Chadwell springs, in Hertfordshire (New River Company), and small as the

population was in comparison with that of our day, the need of a better and more regular supply was keenly felt in various parts of London. Nothing came, however, of this proposition, owing to the intervention of the troubles arising out of the Civil War; nor were subsequent promoters of identical schemes, in 1719, in 1766, and 1789, more successful in attaining their objects. It has been well said that history repeats itself; and an exemplification of the truth of this adage will be found in the fact that Mr. Webster's pumping stations at Springwell, whence such an enormous quantity of pure water can be obtained, are close to the site of the old Gutchwell\* springs, which it was intended to utilise under the schemes we have alluded to, yielding "six tuns per minute." The old measure of a tun was equal to four hogsheads, or 252 gallons, making a total amount in twenty-four hours of 2,177,280 gallons. The Gutchwell springs have almost disappeared; it is probable that they were destroyed and the supply to them intercepted, at the period of the construction, at the end of the last century, of the Grand Junction Canal, which traverses the spot where they formerly existed.

But we must reserve any further digressions till the closing portion of this article; for several score visitors are waiting to complete the journey on to Harefield Grove, being fully prepared by their exertions and by the fresh country air to do justice to the very excellent luncheon provided by the hospitable host, Mr. Webster. Arrived at the mansion, not much time is lost before the guests† are placed at the

\*Query:—Gutch, a local corruption of the word Gush.

†Including amongst them Major Flower, Mr. Jabez Hogg, Dr. Percy Frankland, Dr. Abbotts, Mr. Grover, C.E., Mr. John Gwynne, C.E., Mr. Claud Monckton, C.E., Surgeon-Major Cuffe, Prof. Lobley, Dr. Cooney, Mr. H. Firmin, Dr. Caldwell Smith, Major Mills, Capt. J. E. Stewart, Mr. Whitcombe, C.E., Dr. T. M. Drown (Boston, U.S.A.), Mr. Stanislaus von Serkowski (Cracow), Mr. Ponsonby Dalrymple, Mr. S. Arnett, Mr. C. J. Cozens, Mr. Filgate, Mr. Harvey Fellowes, Mr. Alexander Stephen, Mr. W. Larkins, &c.

table. The post-prandial proceedings, owing to the admirable brevity of the few speeches, do not occupy too much time, and after coffee has been served, the visitors light up their cigars and take a stroll through the admirably-kept gardens and greenhouses. In the evening the wagouettes are finally brought into requisition to convey the party to Rickmansworth, where the special train is waiting, and in less than three-quarters of an hour we run into Euston Station, where we part with our fellow-travellers, loth to leave the comfortable saloons and pleasant company. Everything must have an end—even the Three per Cents. and Upper Wimpole Street, of which Sydney Smith used to say that they possessed nothing of the finite about them.

WHY SHOULD LONDON WAIT? is a question which has of late years been put, through the public press, when some important social or sanitary matter has demanded prompt attention. Why should London wait, indeed, when such an important problem as the supply to the metropolis of an adequate quantity of water of good quality is waiting for solution? Why should our governing bodies continue, day after day, and decade after decade, to place before us a series of dissolving views, in the shape of visionary projects for obtaining a better water supply from the Welsh mountains, from the lake district, and other far distant sources, merely to tantalise us, and then tell us that the scheme is impossible on account of the gigantic expense that would have to be incurred? It must be out of a spirit of "cussedness," seeing that they wholly ignore the abundant supplies that could be procured within easy reach; or it must be that they are playing into the hands of the water companies, allowing the latter to go on selling at a price bearing an inverse ratio to its value,—water derived for the most part from the rivers Thames and Lea; both of which have in the vicinity of the companies' intakes, and

above those points large populations necessarily contaminating the water, even supposing that it were pure originally, which is not the case. The companies profess, by filtering processes, to insure that the supply is pure and wholesome; theoretically, this sounds all very well, but practically their argument is often a delusion and a snare. Not many months ago one of the largest of the metropolitan water companies was brought under the censure of the House of Commons in consequence of the unsatisfactory, dangerous, and filthy condition of its supply. The only excuses which their apologists could make were that their reservoirs were not large enough, and that their filter beds were insufficient. But we shall hear nothing of these glaring faults when the question of compensation crops up. Moreover, one of the highest authorities upon this subject says: "The process of filtration through sand, resorted to by the water companies, by no means guarantees the removal of micro-organisms; and the process does not insure the safety of such water," *i.e.*, for drinking and culinary uses.\* Having these facts set before us, it is not with a very cheerful feeling that we read in one of Sir Francis Bolton's reports that the proportions of the different waters supplied to the metropolis at the date of his writing were, out of every 100 parts, 51 of Thames water, 37 of Lea† water, and twelve of water from

\* How little filtration succeeds in separating organic matter is evidenced by a report, in 1849, by Dr. Arthur Aikin and Professor Alfred Swaine Taylor. These eminent chemists stated in their report that the water then supplied to Hull contained, when unfiltered, 3·2 grains of organic matter per gallon: after it had gone through the process of filtration it contained 3·0 grains per gallon. According to this analysis, only one-fifth of a grain, or the sixteenth part of the whole amount, was got rid of.

† Why do so many officials write the name of this river as if it were spelt "Lee"? The old spelling, Lea, most people can understand as having reference to the meadows through which it shapes its course; but "Lee" there seems no reason for, except, possibly, that "Lee" makes in the plural "Lees," which is another term for dregs or sediment, and, certainly,

wells sunk in the chalk; in other words, while only 21,000,000 gallons were derived daily from the purest source, 147,000,000 gallons were abstracted from the Thames and the Lea.

Having shown in this and previous articles published in HYGIENE\* that, in point of quality, river water cannot be compared with spring water from the chalk, three other points remain for consideration:—1. The quantity available; 2. The relative cost of procuring it; 3. The suitability of the water for all domestic purposes.

As regards the first point, we may dismiss it with the observation that the weight of practical authority, as set out in the quotations we have already given touching upon this question, is wholly in favour of the assumption that the water supply from the chalk within easy reach of London is more than sufficient to meet all the requirements of the metropolis. If there were any doubt upon this matter, a system of dual supply, viz., of pure spring water for drinking and culinary purposes, and of river water for flushing, street watering, extinguishing fires, &c., might be adopted. 2. With respect to relative cost, Mr. Alexander Fraser, Engineer to the Grand Junction Water Company, has given it as his opinion that the working expenses of a supply from the chalk would be less than that of an additional supply from the Thames. 3. In consequence of its comparatively greater hardness, through the presence of carbonate of lime, it has been argued that water from the chalk is relatively unfit for certain culinary purposes, such as making tea and for washing; but this objection is entirely disposed of by the fact that,

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he would be a bold man, or an ignorant, who ventured to deny that dregs or sediment exist to an abnormal extent in the water of the river which furnishes 37 per cent. of the London supply.

\* In the present year articles, entitled "Is Thames Water fit for Drinking Purposes?" by the Editor and Mr. Jabez Hogg, have appeared in the March and April numbers; also, "On the Sanitary District of Staines, and Thames Water" (May), and "Pure Spring Water for London," giving an account of Mr. Webster's water supply at Springwell (July number).

by Dr. Clark's process, any water, however hard, can be readily and inexpensively softened to the required extent before it is distributed through the mains to the consumers. Reporting upon the Springwell water, under the date of April 25th, 1888, Dr. Frankland, F.R.S., observes that its hardness is neither excessive nor much greater than that of the river water supplied to London; also, that after any necessary treatment by Clark's process, for the reduction of the degree of hardness, it would be "unparalleled for all domestic purposes." We ought not to pass over a fact which is strongly in favour of spring water. It has at all seasons a normal temperature of 51° Fahr., thus averaging 18 degrees colder in the summer, and 18 degrees warmer in the winter, than river water. Thus, apart from its purity, its freshness, and greater amount of aeration (through its holding a larger relative quantity of air and oxygen in solution), it is more agreeable than other water as a beverage in the hot summer months, while the liability to the bursting of pipes in frosty weather (the Londoner's bugbear in winter) is proportionately diminished.

The Lord Mayor, Sir Joseph Savory, on a recent visit to Glasgow, stated that "the one great idea" which he and the Sheriffs had in mind was to see what that city had done to supply itself with pure water. We hope that his lordship and others of influence will recognise, not only the necessity of supplying pure water to London, but also the fact that a bountiful supply of unsurpassable quality can be brought to the metropolis in two or three years, at a moderate cost, from a district within twenty miles of St. Paul's. Why should London wait, indeed?

"The end crowns all;  
And that old common arbitrator, Time,  
Will one day end it."\*

All who have watched the development of the metropolitan water supply question must agree with us that Londoners have waited long

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\* Shakespeare: "Troilus and Cressida."

enough for Time's decision, and that another great "common arbitrator," Public Opinion, should now step in and settle this important matter, instead of delaying until some fearful epidemic compels attention to the subject.

### BRITISH HEALTH RESORTS.—No. 17.\*

#### LYME REGIS.

THERE is always something indescribably painful in the end of anything: the end of a visit seems to mark the close of another chapter in the book of life, and one feels that one is older and sadder, although pleasant memories may remain with us henceforth to lighten the load of present worries and disappointments. The greater the quaintness of a place, and the more complete its isolation, the more striking must be the impression which a visit to it makes on the mind of the stranger—and Lyme Regis, in the far west of Dorset, still remains a town living in the distant past. Few new houses are springing up around it; no railway connects it with the great world; it still survives, a link with the past, nestling securely in the midst of rich, hilly country inland, and of a beautiful expanse of sea to the south. It is as secluded as Swanage was before the new railway, while its beauty and natural advantages are vastly greater.

Lyme is six miles from the nearest station, Axminster, on the South-Western, and the

\* The object of this series is to direct attention to the merits of different British Health Resorts, too often overlooked and neglected by persons who are put to much expense, trouble, and loss of time, in visiting Continental Spas, instead of availing themselves of facilities open to them in their own country. No. 1, Hastings and St. Leonards; No. 2, Cornwall; No. 3, Droitwich and its Brine Baths; No. 4, Swanage; No. 5, Isle of Man; No. 6, Lowestoft; No. 7, Llandrindod Wells; No. 8, Rostrevor (Ireland); No. 9, Cromer and Yarmouth (Norfolk), and Rye and Camber (Sussex); No. 10, Brighton; No. 11, The Undercliff, Isle of Wight; No. 12, Bournemouth, by Rev. R. A. Chudleigh; No. 13, The Climate and Surroundings of Bournemouth; No. 14, Yarmouth; No. 15, Dinsdale-on-Tees; No. 16, Ilfracombe; No. 17, Lyme Regis. Any single number can be had post free by remitting seven stamps.

drive from the latter is one of the most beautiful in the south of England, through a smiling country, and with occasional peeps at the sea. A drawback, which the visitor much feels, is the steepness of the roads and the long and sharp descent into the town, though it is to this undulating character that the beauty of the scenery is due, while the hills nowhere rise so high as to become bare.

The town is old world, and the poorer classes have none of the smartness of their townsfolk in the larger centres of population. The streets are usually narrow and winding, running rapidly down to the water. A couple of thousand all told seem to make up the population, and there are no signs of a rapid increase. The distance from Axminster and the steep hills are explanations of the absence of speculation and enterprise. But Lyme is certain to be connected with Axminster or Bridport before many years pass; and, indeed, some time ago a railway was talked about, and matters went so far that the first sod was turned; but the steep gradients and small population raised doubts as to the wisdom of a railway, and it was stopped. Had that railway been completed, although the promoters might have lost, the line would ultimately have paid, and the town would now be surrounded by large numbers of handsome houses.

But the beauties of Lyme have attracted some visitors, and the magnificent house, called "Roosden," which Sir Henry Peek has built, is a proof of this. In time the cliffs may be covered with a succession of noble seats. The residence of Mr. Lister is another exquisite place, smaller than "Roosden," but as charmingly situated, with gardens as beautiful, while Mr. Lister's eminence as a microscopist, and his singular facility of expression give him far higher claims than those of an ordinary well-bred man of the world; and his demonstrations of the "Myatozoa" can never be forgotten by those who have been fortunate enough to hear them. Dr. Bungay, one of the medical prac-

titioners of the place, has also a beautiful residence, and he is a man of culture and wide information.

The principal hotel is the Golden or Royal Lion, as it is now called, since the Prince of Wales honoured it by a visit; it is old and quaint, a pleasant change after the huge barracks of larger towns: the manager, Mr. Grove, is not less pleasing than his old world establishment—tall, genial, perfectly at his ease, well-informed and humorous, he is wholly unlike the silent, sedate manager of a large town hotel, and therefore ten times more agreeable. Perhaps it would be truer to call Mr. Grove the host in the good old English sense—the agreeable and obliging person who provides accommodation for visitors, not the obsequious tradesman of our more prosaic age. Few things show the changes of modern life better than the transformation of the genial, talkative host of the olden times into the prim, silent personage of our day, and it is only in such places as Lyme that one finds the bright, intelligent and friendly host, the man who looks upon his customers as guests and friends, and whose genial conversation and unconstrained manners give a charm to a sojourn under his roof.

Lyme has a long and eventful history, and can point to streets which were highways a thousand years ago, and to a sea wall or breakwater going back five hundred years and more, that is from its commencement. The church is decorously kept and has features of great interest—one being a Norman arch of much beauty. Among more modern objects of importance is the house in which Lord Chatham lodged when, as a boy, he visited Lyme to recruit his health; this house is now a chemist's, who very courteously allows visitors to see the room once occupied by the great statesman.

Shops are not numerous but good, and he must indeed be exacting who will not find all he can possibly require in them, while the neighbourhood, with its beautiful excursions,

will provide occupation and variety enough for many a delightful week.

Lyme is hardly a place that would satisfy the lover of crowded piers and gay shops, nor is it surrounded by busy populous places, but it has a charm of its own, and as a change it would be hard to find a town with more to recommend it. Its soft climate, clear sky, and sheltered situation remind us of many other west country watering places far from the busy world, delightful from their seclusion, plant-treasures and rich scenery. ALFRED J. H. CRESPI.

## Reviews and Notices of Books.

*Food and Feeding*: By SIR HENRY THOMPSON, F.R.C.S., M.B. Lond. Sixth Edition. Pp. 222. London: FREDERICK WARNE & Co. 1891.

THE sixth edition of a well-known book by a well-known author does not need much comment at our hands. The importance of the proper selection and preparation of food, the varied materials at man's command, the ordinary dietary of English people, the contrast between it and that which prevails on the Continent—these and many other topics are discussed in "Food and Feeding," which contains some fifty pages more than the previous (fifth) edition.

Sir Henry Thompson regards the food generally adopted as too solid or stimulating, and throughout the book this will be found to constitute the key-note. It is rather to skill in cooking than to the quantity of food consumed that attention should be directed. The dreary monotony of the dinner-table of many a middle-class family is both appalling and wasteful. Speaking of such an establishment Sir Henry observes:—"Joints of beef and mutton, of which we all know the very shape and changeless odours, follow each other with unvarying precision, six roast to one boiled, and have done so ever since he"—the average

middle-class Englishman—"began to keep house some five-and-twenty years ago!" But, as Sir Henry reminds us, roast meat is rarely to be obtained, if we apply the term in the good old sense, viz., where the joint is cooked in front of an open fire. Without disparaging the improvements effected by some of our principal cooking range manufacturers, the difference between roasting and baking (as in a range, whether close, or partially ventilated), is necessarily considerable, while the superiority as regards results rests with the former process.

Sir Henry Thompson lays great stress upon the value of braising in the preparation of animal food; and regrets that it is not better understood and more generally practised in this country. Certainly, braising, as ordinarily practised by English cooks, does not very strongly commend itself. For its proper performance the meat should be just covered with a strong liquor of vegetable and animal juices (commonly called *braise*) in a closely covered vessel; this should be exposed for a considerable time to a surrounding heat just short of boiling, as little evaporation as possible being permitted. In this manner, even the most fibrous and toughest flesh can be made tender and readily digestible.

Soups are too little used in England, although they constitute an excellent and economical form of food, and the author of "Food and Feeding" consequently devotes considerable space to them. In connection with this subject some of our readers will doubtless recollect the amusing controversy which arose a few years ago when Sir Henry Thompson stated in a paper read by him at the Fisheries Exhibition that turtle soup when *at its best* was composed of a stock made from the conger eel, the turtle furnishing the garnish and the name. Several vendors of turtle soup, and other persons apparently over-zealous in their anxiety to protect, as they thought, the injured reputation of the civic banquets, took up the cudgels against Sir Henry, but he succeeded in eventually silencing his critics. Bouillabaise, the famous

Marseilles dish, of which that erudite gourmet, George Augustus Sala, never tires of reciting the praise, is a kind of fish soup or stew. Thackeray also descended upon its excellence, but in rhyme, as witness the following extract from his Ballads:—

"This Bouillabaise a noble dish is—  
A sort of soup, or broth, or brew,  
Or hotch-potch of all sorts of fishes,  
That Greenwich never could outdo;  
Green herbs, red pepper, mussels, saffern,  
Soles, onions, garlic, roach, and dace;  
All these you eat at Jerré's tavern,  
In that one dish of Bouillabaise."

"All these" ingredients, indeed, and many others, as our readers would find on referring to the excellent recipe given by Sir Henry Thompson.

But the author does not confine his attention to the table of the well-to-do householder, and the keynote of the whole book is economy of food, with excellence of cooking, and perfection of diet. On the same page, 139, as that which describes the elaborate preparation of bouillabaise, Sir Henry gives a recipe for a nutritious, appetising, and cheap fish stew, within the reach of a working man's means. For this recipe, and a large number of equally good ones, adapted to all incomes, we must refer our readers to the book itself.

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#### AIR AND LIGHT: A DOCTOR'S STORY.

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BY W. M. CARLETON.

[The following humorous verses express in a clear and racy manner one of the greatest difficulties with which medical practitioners have to contend, viz.: the fondness of their patients for swallowing physic, while ignorantly or carelessly neglecting the simplest rules of Hygiene.—ED.]

#### I.

Good folks ever will have their way,  
Good folks ever for it must pay.

But we, who are here and everywhere,  
The burden of their faults must bear.

We must shoulder others' shame,  
Fight their follies, and take their blame ;  
Purge the body, and humour the mind,  
Doctor the eyes when the soul is blind ;  
Build the columns of health erect,  
On the quicksands of neglect ;  
Always shouldering others' shame,  
Bearing their faults, and taking the blame.

## II.

Deacon Rogers, he came to me,  
" Wife's a-going to die," said he ;  
" Doctors great and doctors small,  
" Haven't improved her any at all ;  
" Physic and blisters, powders and pills,  
" And nothing sure but the doctors' bills !  
" Twenty old women, with remedies new,  
" Bother my wife the whole day through.  
" Sweet as honey, or bitter as gall—  
" Poor old woman, she takes 'em all ;  
" Poor old woman, she daren't refuse,  
" Sour or sweet, whatever they choose.  
" So she pleases whoever may call,  
" And death is suited the best of all."

## III.

Mrs. Rogers lay in bed,  
Bandaged and blistered from foot to head ;  
Bandaged and blistered from head to toe,  
Mrs. Rogers was very low.  
Bottle and saucer, spoon and cup,  
On the table stood bravely up ;  
Physic of high and low degree,  
Calomel, catnip\*, boneset† tea.  
Everything a body would bear,  
Excepting light and water and air.

## IV.

I opened the blinds ; the day was bright,  
And God gave Mrs. Rogers some light.

\* Catnip ; a species of "Nepeta," much in use in the United States in the treatment of colds, indigestion, etc.

† Boneset ; a plant of the "Eupatorium" species, reputed to possess tonic and diaphoretic properties

I opened the window ; the day was fair,  
And God gave Mrs. Rogers some air.  
Bottles and blisters, powders and pills,  
Catnip, boneset, syrup and squills ;  
Drugs and medicines, high and low,  
I threw them as far as I could throw.  
" What are you doing ?" my patient cried ;  
" Frightening death," I coolly replied.  
" You are crazy," a visitor said ;  
I flung a bottle at her head.

## V.

Deacon Rogers, he came to me,  
" Wife is a-coming around," said he.  
" I really think she'll worry through,  
" She scolds me just as she used to do.  
" All the people have poohed and slurred,  
" All the neighbours have had their word ;  
" 'Twas better to perish, some of 'em say,  
" Than be cured in such an irregular way."  
" Your wife," said I, " had God's good care,  
" And his remedies,—light and air.  
" All of the doctors, beyond a doubt,  
" Couldn't have cured Mrs. Rogers without."

## VI.

The Deacon smiled, and bowed his head,  
" Then, your bill is nothing," he said.  
" God's be the glory, as you say !  
" God bless you, doctor ! good day, good day !"

## VII.

If ever I doctor that woman again,  
I'll give her medicines made by men !

ADULTERATION.—Artificial bitter almonds are the latest development of ingenuity in this direction. The false seeds are composed chiefly of grape sugar, with a very minute quantity of nitro-benzole, which imports to them the necessary flavour. Pressed in a mould, they so closely resemble natural almonds that, when a number of false seeds are mixed with true ones it is almost impossible to distinguish them by mere inspection.

## Notes and News.

HEALING BY FAITH has been hitherto regarded as the most idiotic outcome of fanatical credulity, but one of Mr. Spurgeon's followers has lately beaten the record by introducing a new form of this craze which might be termed physiology by faith. Presiding over a supplication meeting, commencing the eighth week of special prayers for Mr. Spurgeon's restoration to health, Mr. C. Cornell, referring to the disease from which Mr. Spurgeon is suffering, said that a gentleman had remarked to him on the previous day, "A man cannot get a new kidney." "Why not?" he (the chairman) replied; "the Lord could give a 'new heart,' and a 'renewed spirit,' and following up this line of argument Mr. Cornell urged that kidneys or any other organ wanted would be supplied if they only prayed enough. Pursuing this theme, he told his audience that if he (the chairman) were for a moment convinced that Mr. Spurgeon's recovery was an impossibility, he would not again offer a prayer for his restoration to health. Cautious Mr. Cornell! "The prayers had been answered up to the present, for Mr. Spurgeon's life had been spared." That it may continue to be is our hearty wish; and we trust that the eminent minister may yet regain his health. Possibly, in such an event, Mr. Spurgeon, who amongst his excellent qualities possesses keen humour as well as sound sense, may ask the congregation to join with him in praying for a "new brain" for Mr. Cornell.

ONE WAY OF PROMOTING TEMPERATE HABITS.—Dr. Lettsom records the case of a man who took twelve drams of spirits daily, but, having determined to wean himself from this practice, he adopted the following expedient. He always drank from one glass, into which he let fall a large drop of sealing-wax after taking each dram. In this way he gradually reduced the quantity of spirit consumed, until at last his glass became filled with wax, and the habit was eradicated.

POISONOUS BERRIES, ETC.—Two inquests have lately been reported upon children killed by eating, in the one case the red berries of the common bryony (which the poor boy thought were small cherries), in the other, the seeds of the laburnum. Unfortunately such cases are of frequent occurrence at this time of the year. To some extent, at any rate, they might be prevented by the exhibition on the walls of school rooms of pictures showing the common plants and fruit which are of a poisonous character; in addition, the teacher might occasionally give a few words of explanation and warning to the children.

INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.—The permanent International Committee has appointed the following International sub-committee to prepare a scheme for the organization of future congresses. The sub-committee consists of Professor Dr. Brouardel (France), Professor Dr. Fodor

(Hungary), and Professor Corfield (England), to represent Hygiene; and M. Körösi (Hungary), and Dr. Janssens (Belgium), to represent Demography. The sub-committee will consider the advisability of forming permanent committees in various countries, the plan of having committees outside the country in which the congress is held having proved so successful in obtaining foreign members for the London Congress, at which it was adopted for the first time.

FASHIONABLE FOLLIES.—It is a curious fact that the origin of many fashions may often be traced to deformities or other circumstances which it has been thought desirable to conceal in persons of high rank. Charles VII. of France introduced long coats to hide his ill-shaped legs; full-bottomed wigs were invented by a French barber in order to cover from view an unsightly lump on the shoulder of the Dauphin; and the practice of wearing patches is said to have been devised by a lady of distinction, who was thus enabled to ingeniously obscure a wen on her neck. Many instances of a similar character could be given; for example, an empress revived the fashion of wearing hoops (so pleasantly ridiculed by Addison, in the *Spectator*) to prevent her condition from being known; and to crown the height of modern feminine folly, when a certain royal personage had the misfortune to suffer from an affection of the hip, inducing lameness, thousands of Englishwomen had their boots purposely constructed with one heel higher than the other, so that when walking they might be compelled to limp as completely as the lady whose temporary physical ailment they probably found more easy of imitation than her good qualities.

MEDICAL POETS have flourished at various periods, for instance, Akenside and Oliver Goldsmith, but they have been content with devoting their pens to general subjects. It appears, however, that in Edinburgh hospital surgeons have at times recorded their professional achievements in rhyme, of which the following, attributed to Sir Douglas Maclagan, M.D., is a specimen:—

Case Second : An unhealthy lad  
To Duncan's Ward came in, sir,  
And showed to him a shocking bad  
Affair upon his shin, sir.  
Says Duncan, twirling of his probe,  
I fear that this won't cobble;  
'Twill never make a decent job.  
And all your life you'll hobble.  
He gave the ether. Off the leg  
Was snipped before their noses;  
Chap woke and found a wooden peg  
Where there had been necrosis.

LONDON STREET ACCIDENTS are reported by the Metropolitan Commissioners of Police to have amounted to 5,728 last year. Of these 144 were fatal. Apart from the immense number of privately owned vehicles of all kinds, there are now 15,000 licensed conveyances, omnibuses, trams, and cabs, daily traversing London thoroughfares. It is therefore a subject for small wonder that, taking the working period for traffic at sixteen hours out of twenty-four, an accident occurs hourly somewhere in the metropolis. Still, this fact abundantly demonstrates the necessity of providing underground crossings at some of the most congested and dangerous points.

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## SPECIAL NOTICES.

**EDITORIAL.**—The editor begs to thank all of those gentlemen who have kindly forwarded copies of papers read by them at the recent International Congress of Hygiene. Several of these appear in the present number of HYGIENE, and others will be published in subsequent issues. The editor will be pleased at any time to receive communications, books for review, etc., bearing upon the numerous important subjects dealt with in these columns. He takes this opportunity to request his many correspondents to note the change of address referred to below.

**PUBLISHER'S NOTICE.**—Beaumont and Co., publishers, beg to notify that, in consequence of the necessity of acquiring larger premises, they have taken the house, 39, Southampton Street, Strand, W.C., where their business will in future be conducted and HYGIENE published. With the increased facilities at their command, Beaumont and Co. will be now prepared to undertake any printing or publishing which may be entrusted to them.

## MANUAL TRAINING IN RELATION TO HEALTH.

By SIR PHILIP MAGNUS.

AMONG the many changes that have taken place in the system of national education during the last decade, by no means the least important

is the practical recognition of the principle that education is the right development of all, and not of some only, of the faculties of mind and body in preparation for complete living. As regards the mental faculties, we were accustomed in times, not so long ago, to speak of the five senses as the sole agencies through which mind and the external world were brought into close relation. Of these five senses, the eye and the ear were not only the chief but the only sense organs that were utilised, and these only in so far as they served for the exercise of memory. Education consisted mainly of repeating facts acquired at second-hand. The senses themselves, as organs of perception, were very little cultivated, and among these the muscular sense was not included. Yet it has now been long known that much of knowledge which we acquire by the direct action of the eye is the result of muscular changes, and that by far the greater part of our knowledge of the external world is due to the action of the limbs, and to the muscular impressions produced upon the brain through the calling into play of the appropriate nerve centres. With all this Physiology has made us fully familiar. But education (which from its theoretic side may be regarded as an applied science) has been slow to recognise the necessity of cultivating the muscular sense as a means of acquiring knowledge. Indeed, the acquisition of knowledge at first hand has been little considered.

The revolution that is associated with the New Education is little more than a protest against teaching by authority and the substitution therefor of teaching by observation and experiment; and this new departure implies the training of all the organs which are concerned in giving exact notions of the things about us. This is a great advance on learning by memory only. The new education demands the careful training of all the organs by which knowledge is primarily acquired. It rests, therefore, on a psychological and physiological basis. Manual training is claimed as a subject of school instruction because it serves to exercise conjointly, and in harmony with one another, the muscles and nerve centres of the hand and eye which are concerned in perception.

This is the intellectual side of the argument for the introduction of manual training into our schools.

Although of importance in the education of all children it is of more importance in the training of those who have mainly to employ their hands in the work of life, as helping to create aptitudes and fix sense impressions in the brain, which will subsequently prove serviceable to them. Regarded from the economic or industrial point of view, much has been said of late in favour of manual training, in connection with the question of technical education. To our young artisans there is little doubt that instruction which serves to exercise the hand and eye, to teach exact notions of form and size, of mass and hardness, and to enable the hand to represent on paper, and to reproduce in material what the eye perceives, is most serviceable; and if at the same time the instruction can create aptitudes for using instruments of precision and can develop handiness concurrently with the training of the intellect its educational value must in course of time be generally recognised.

It is only five years ago, at the Birmingham meeting of the British Association, that I ventured to put forward these arguments in

favour of manual training, and, relying mainly upon my experience of foreign schools, to urge upon the authorities responsible for our education the desirableness of introducing such teaching into our public elementary schools. At that time France, Belgium, and Holland had brought the workshop into the school, and the system of manual instruction known as *Slöjd* was generally adopted throughout Sweden.

In the United States the new idea was readily seized, and societies were established, and a whole literature came into existence to advocate manual training. As authority for such an innovation in our methods of instruction, it was pointed out that similar teaching had been strongly recommended by many of the most eminent writers on education of all times, and Comenius, Locke, and Rousseau were quoted in support of this new subject of instruction.

The progress of the movement during the last few years has been very rapid. Tried experimentally in one or two schools at first, and later on more systematically in London under the auspices of the School Board and the City Guilds Institute and the Drapers' Company, the subject, which is now formally recognised in the Education Code, is to be very generally adopted in our schools. Already there are over 700 boys under instruction in connection with the School Board of London. These children vary in age from 11 to 14; they come from 61 different schools, and receive instruction in 9 centres in the metropolis.

But at present we are only at the beginning of the movement. New centres of instruction are being rapidly formed, and before Christmas next it is expected that in London alone provision will be made under the London School Board for the manual training, in properly fitted workshops, of nearly 3,000 boys.

In other cities, particularly in Manchester and Liverpool and Birmingham, equal progress has been made, so that before long we may expect to find the whole of our future artisans undergoing a supplementary training altogether

different in kind from that which hitherto has been provided in our public elementary schools.

There is another aspect in which manual training may be considered, which is of equal importance with the intellectual and industrial points of view, and that is in its relation to the health of the children. Experience and theory both show the value of the instruction as a mental exercise and as a serviceable preparation for the actual work of life. But in education the *corpus sanum* has to be considered as well as the *mens sana*, the healthfulness of an occupation as well as its intellectual character and utility. In visiting foreign schools I was struck with the superior physique of the boys engaged in the school workshops over those occupied the whole day in sedentary pursuits, and these observations have left no doubt in my mind that manual training conduces to physical growth and development. But casual observations such as these do not count for much, and the subject is one well deserving further inquiry.

Some few years ago there was a great outcry that the children in our elementary schools were being over-instructed, and that their minds were being educated at the expense of their bodies. The cry of "over-pressure" was everywhere heard, and many who were silently opposed to all education of the people took advantage of it to proclaim that we were injuring the physical constitution of our future working classes, and were training a body of short-sighted, narrow-chested, muscularly weak artisans, whose smattering of learning would prove no adequate compensation for their deterioration in physique. The outcry did some good, for it drew attention to the condition of elementary education, and accelerated the improvements which have since taken place. Careful investigation showed that children suffered more from *underfeeding* than from *over-pressure*, and soup kitchens and penny dinners have since been more liberally provided. But the causes of underfeeding could not, unfortunately,

be permanently removed; and, allowing for some exaggeration in the "over-pressure" cry, it was ascertained that the conditions of our primary instruction did tend to encourage undue pressure of both teachers and pupils. The competition for money grants on results was altogether unwholesome and has been gradually discontinued. But apart from that, the education provided in our schools was shown to necessitate too much sitting, too much reading and learning by heart, and to take too little account of the natural and spontaneous activity of the child.

It failed to develop the child as a whole, in accordance with its physical constitution, and the natural overflow of vital energy was restrained instead of being directed into channels of future usefulness. The remedy for this could not be found in mere physical exercise in drill, gymnastics, or in ordinary recreation; for these subjects occupied a large amount of time and could not well be made educational in character. The school hours, if devoted exclusively to book learning, and employed in sedentary occupation, were too long, and proved too great a tax upon the child's strength, and the system failed to ensure at once healthy development of body and intellectual progress. What was needed was a subject of school instruction, which, through the exercise of the muscles, should stimulate the brain and at the same time secure intellectual discipline. This was found in manual training. Experience shows that where manual training has been introduced into schools, it is helpful in maintaining the body in a healthy condition, whilst serving at the same time to stimulate the mental powers. Theoretically this is only what one would expect, but experience has verified the expectation. M. Salicis, the founder of the Ecole Journefort, at Paris, to whom the movement in favour of Manual Training is so largely due, tells us, after an experience of sixteen years of Paris Schools:—"The children thrive, notwithstanding that their attendance

in school is longer by two hours than the regulations provide." And the instructions placed at the head of the programme for manual training now observed in all French schools, fully recognise the advantage of such teaching from a hygienic point of view. In defining its object we are told: "Manual training has a double purpose, one of which is to strengthen the body, to invigorate the constitution of the child, to place him in the hygienic conditions most favourable to a general physical development." From all countries we have testimony of the salutary influence of this training, and our own experience shows that apart altogether from the industrial advantages which children derive from the aptitudes it creates, it quickens their intelligence, and increases their interest in their ordinary lessons, enabling them to fix their attention with less loss of energy upon their other studies.

There can be no doubt that the concurrent development of all the functions and faculties of the child is an indispensable condition of healthy education. Without some kind of manual training, this cannot be effected. We are told that the brain consists of distinct parts which subserve separate offices, and that certain nerve centres situated within the brain regulate and initiate through the will distinct muscular actions. These nerve centres appear to control actions which are more susceptible of educational influences than the reflex actions referable to the spinal cord, and the development of these motor centres, and consequently the due development of the brain of which they form a part, depends upon their being called into use and properly exercised.

It would appear, moreover, that each such centre has a definite period of growth during which the exercise of the organ it controls conduces most to its development, and that if this exercise is neglected the nerve action in the brain is enfeebled; and the activity of the organ is impaired. It is important, therefore, that education should seize upon the organ

during the period of development of the corresponding nerve centre, if the organ is to be trained to most advantage. Experience fully confirms these inferences from experiments, and shows that manual dexterity and nearly all other aptitudes are best acquired during early youth, and that no amount of exercise in after life can compensate for omissions in our early youth. Sir James Crichton Browne, who is, perhaps, an unwilling witness to the advantage of introducing manual training into our elementary schools, tells us: "The nascent or development period of the hand centres have not yet been accurately measured off; it probably extends from the first year to the end of adolescence, but there can be no doubt that its most active epoch is from the fourth to the fifteenth year, after which these centres become comparatively fixed or stubborn." And he goes on to say that boys and girls whose hands have been left altogether untrained up to the fifteenth year are practically incapable of high manual efficiency ever afterwards. In this statement we have a powerful argument, from the economic point of view, for making hand and eye teaching concurrent with other instruction throughout the whole period of a child's primary education. But I do not desire now to dwell upon this aspect of the question, but to indicate rather the general effect of such training on a boy's health. On this point the same authority may be again quoted with advantage. He says: "The boy who is reared with his hands bandaged physically or morally, or who is by any means withheld from ample exercise and varied discipline of these wonderful and willing organs, must grow up to some extent feeble and incapable"; and he adds, "Depend upon it, much of the confusion of thought, awkwardness, bashfulness, stutterings, stupidity, and irresolution which we encounter in the world, and even in highly educated men and women, is dependent upon defective or misdirected muscular training, and that the thoughtful and diligent cultivation of this is

conducive to breadth of mind as well as to breadth of shoulders."

It may be taken then as proved that without exercise that brings into discriminative use the muscles of the hand, the brain itself may be said to be only imperfectly developed, and the general vitality is lowered in the same way as if any other sense is not utilised. But it is owing to the general and uniform muscular development of workshop exercises properly drilled, that the health of schoolboys between eleven and fifteen years of age is undoubtedly improved. To the children of all classes such training may be considered, on purely intellectual grounds, a necessary part of school education, and it is satisfactory to know that workshops have been recently attached to very many public and endowed schools. But to the children who frequent our national schools, and who form the bone and sinew of our population, such training is still more important, not only intellectually, industrially, and morally, but also with regard to their muscular development. The conditions under which they live give fewer opportunities for healthful physical exercises than are enjoyed by children who are placed in more favourable circumstances; and the fact that the majority of these children will be occupied with manual work during the greater part of their lives is an additional argument for utilising a portion of their school days in the training of those organs on the usefulness of which their future progress so greatly depends.

Dr. Woodward, to whose intelligent and well-directed efforts the development of manual training in American schools is largely due, takes for granted without argument the hygienic value of such instruction. "It almost goes without saying," he tells us, "that the varied exercises of a manual training school are highly conducive to physical health."

It is a fact of some importance that the introduction of workshop instruction into schools has the effect of lessening the necessity for punishment. I think we may assume that

any education in which punishment is frequent is an unhealthy education. The effect of punishment is to depress the nervous system and to diminish the intellectual energy needed for school work. Even where under the influence of fear some better results are temporarily obtained, the general vitality of the child is lowered by punishment, and the educational results are less satisfactory than they might have been. The progress of educational science is shown nowhere to greater advantage than in the decrease of punishment as a means of school discipline, and the effect of these improved methods on the health of children generally, and particularly of children of nervous temperament, cannot be over-estimated.

Now, manual training is a school exercise which is not only interesting in itself, but quickens a child's interest in many of his other lessons, and the desire to take part in the workshop instruction is a wholesome inducement to attention and to general good behaviour. In the course of time there is no doubt that by adequately exercising, without subjecting to any painful strain, the various intellectual organs, all school lessons will be made sufficiently interesting to render punishment quite unnecessary. The addition of manual training to the curriculum of schools marks a very important step in this direction.

In order that workshop instruction may yield its maximum hygienic value, it must be given under conditions favourable to health. First of all the school workshop must be constructed on approved sanitary principles. Hitherto we have been content to take any spare room, fit it with benches, and use it as a school workshop. But with the general adoption of manual training, the construction of the school workshop has to be carefully considered, both as regards its size and shape, and the best means of lighting and ventilating it. Then as to fittings, we have to determine the proper height and arrangement of benches, the best kind of tool racks, &c. The mode of handling tools and the position to

be occupied by boys at work so as to prevent injurious muscular development are also matters of importance in their bearing upon the health of the children. On these and on many other points teachers will require to be informed, if manual training is to be a really healthy exercise and is to occupy a prominent position in the school curriculum.

To some of these questions experience has already provided answers; others still await solution. A top-lighted shop, for instance, is not considered as good as one lighted from the sides. As regards the character of the instruction, lathe exercise is not considered as good as bench work. Most of the French schools are provided with lathes, and the boys work in groups of three to each lathe; but on this point Mr. Sluys, the Director of the Normal School at Brussels, well says: "The turner's work is always difficult, and not without danger; besides, it calls for a one-sided effort. We cannot, therefore, give it a prominent place in school work. In a word, woodwork without carving or turning is sufficient to attain the general result, and ought." This view has guided those who have had the direction of manual training in this country, and is in accord with the opinions expressed by other educationists. Rousseau says: "The trade I should prefer my child to choose would be that of a joiner" (and by trade Rousseau only means "manual exercise"); "it is neat, it is useful, it can be practised in the home, it keeps the body in tolerably good condition." The lessons given to teachers at the City and Guilds Central Institution have been restricted to bench work, and in the syllabus of examination for teachers' certificates recently issued by the City Guilds Institute, "woodwork without turning" forms the main part of the examination.

I need scarcely say that not only the intellectual but also the health value of the instruction depends very much upon the intelligence and training of the teachers; and on this point I may be pardoned expressing some satisfaction

that most authorities seem now to concur in the opinion I have elsewhere stated, that the "teachers should be trained schoolmasters." "It is among the primary instructors," says Mr. Sluys, "that the recruiting of teachers for this work is to be done," and further—"the experiment of Basidow, Francke, and others in regard to manual training—the educational bearing of which these teachers well understood—have failed, chiefly because the instruction in this work was entrusted to *artizans*, who considered the school a *workshop*, and treated the pupils as *apprentices*."

It will be seen that there are several important questions connected with the hygienic value of manual training as a school exercise on which it is desirable to collect more exact information than we yet possess.

Information as to the results of manual training under various conditions will serve as a guide in framing rules for such instruction with a stricter regard to its healthfulness than has yet been done. It is very desirable that accurate measurements should be made of the children under instruction, so as to ascertain its effect in increasing muscular development. Records should be kept of the absences of children through illness, of their progress in other studies; and the results of these observations should be considered in connection with the system of instruction adopted. In this way further guidance in directing the teaching on the best lines might be obtained. It must be remembered that manual training is yet, and is likely to remain for many years, a new subject. Its introduction into our schools marks an important change in our system of education. But it is still in its experimental stage. One of its chief advantages is to correct and mitigate the harmful results of that combination of circumstances peculiar to the conditions under which the poorer classes have hitherto been educated, and known as "over-pressure." "In ordinary lessons," says Mr. Sluys, "pupils remain at their desks many hours. This sitting

position is bad; it enfeebles the body and in this way reacts upon the mind. Gymnastic exercise has its *raison d'être* in the need of preserving the organic equilibrium. It increases the functional energy, and through this the moral. Manual exercises, if they are properly chosen, produce similar effects." That manual training may be made the means of developing the muscular strength and of preserving and improving the health of the children in our elementary schools, there can no longer be any reasonable doubt; but it is important both for the intellectual as well as the hygienic value of the instruction that the best methods of training should be adopted, and such methods can only be secured by accurate observations and careful deductions.

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### OPEN SPACES.\*

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By the RIGHT HON. THE EARL OF MEATH.

GRANTED that fresh air and open spaces are needed for the health of the inhabitants of our larger towns, we will briefly consider the two ways of satisfying this need, namely:—

1st. A systematic acquisition and preservation of land for public recreation, in connection with the towns and in relation to their growth.

2nd. Increased facilities for taking people from the towns into the country.

In the towns themselves the governing bodies—the councils—should lay down and should carry out some such rule as the following:—

That public recreation grounds should be provided in each parish, in proportion to the number of its inhabitants.

This would mean that there should be a fixed minimum of open space for a limited number of the population. Here and there the minimum would be exceeded, and so much the better for the people, but it should always be reached, either by securing existing open spaces for the

people for ever, or by acquiring new ones, and this, if needs be, by pulling down houses for the purpose. And for the information of those who are not well acquainted with the question of acquiring open spaces I would mention that much may be done in the towns by securing and throwing open enclosed and deserted squares, disused graveyards, the remnants of village greens (where such have become merged into the towns), vacant plots of railway land, abandoned wharves, market places, &c., &c. The Open Spaces Act of 1877, amended in 1881, 1887, and 1890, the Disused Burial Grounds Act of 1884, with its amendments, and other measures, give all the power that is needed to local bodies to carry out these improvements. The Metropolitan Public Gardens Association, which has been at work in London since the close of the year 1882, has laid out, or assisted to lay out, 65 gardens and playgrounds for the use of the public; has given grants of seats for 31 other sites, either streets or open spaces; has granted money towards the formation and maintenance of 23 public gymnasia; has secured the opening of 166 playgrounds belonging to the London School Board (on Saturdays); and the laying out and throwing open of nineteen recreation grounds; has planted trees, and given grants for tree-planting in thirty-seven thoroughfares and other sites; has opposed encroachments on eighteen disused burial grounds, commons, and open spaces; and has in other ways assisted in the preservation and formation of very many useful recreation grounds. What has been done in London (and it is very little compared to what needs doing) can be done in the other large towns; there is the same opportunity for improving them by bringing green grass, bright flowers, and shady trees into the dingy and monotonous streets.

London and the large towns will increase, and the only question to be settled is: Are they to increase from outside inwards, or from inside outwards? Two diagrams will illustrate,

\* A paper read at the Congress of Hygiene.

in a rough manner, what I mean. The size of the central circles (denoting the towns) is the same. The size of each excrescence, and their number (denoting the suburbs), is the same. The amount of open space enclosed in each dotted circle is also the same, but its distribution is different.

(Diagram 1 showed the largest mass of new houses next to the old centre, whereas the smallest group of new houses adjoined the largest plot of open space. In diagram 2, on the contrary, a larger area of open space is brought close to the old mass of buildings, and the greatest number of new buildings are nearest to the open country.)

There are, perhaps, advantages in either system; but the advantages in the second, from a healthful point of view, if not from an artistic one, outbalance, in my opinion, those of the first. It may be said, however, that the plans are too fanciful to be of any use; that suburbs always grow in accordance with local need and local possibilities; and that a town built in a pattern, and only allowed to grow in a pattern, would be impossible and undesirable. But I am speaking theoretically, and I wish my theory to be illustrated in a purely systematic way. Diagram 2, if carried out, would involve a cessation of building immediately adjoining the original centre, and this is what is most needed. In other words, a town that has reached a certain size should grow no more, except from centres at a given distance outside. I am not speaking of a plan suitable for time and eternity, or to be carried out by generations far ahead of our own. They will need other and much more far-reaching reforms in building, if the population continues steadily to increase. I am speaking of something that is needed at the present time, and of a plan that might now be adopted in several of the larger towns in England. To take the metropolis as an example: It is not so likely to hurt London that Wimbledon or Tottenham should grow to great proportions; what does hurt

London is that all the fields of Fulham and Deptford are being covered with houses. It is the increase from the centre that is so detrimental — the gradual annihilation of the remaining open space which is close to, or forms part of, the towns.

In the towns themselves there should be every effort made to have beautiful streets, with trees and seats in them, and beds of flowers, instead of neglected and dirty corners, and creepers planted on bare walls. Every disused graveyard and deserted enclosure should become a bright garden, and every plot of unused land be made into a children's playground or an outdoor café.

If the preservation of open spaces were properly taken in hand and systematically carried out, there would not be so much need as there is now for increasing the facilities for taking people from the towns into the country. But still it will always be of great advantage, both to young and old, to see new places and breathe different air; to visit the seaside and the rural country. The railway companies have done much of late years to render this possible to a greater number by issuing cheap "fortnightly" tickets for the seaside, &c., and there is more than one useful society at work giving country holidays to city children, and sending the tired seamstress and overworked clerk to breathe the sea air, besides numberless private-people who are doing their best to supply this need by throwing open their own country houses, or paying for the holidays of those who are less blest than they are with this world's goods. This is a question which is not so easily dealt with officially; it is one which, although very important, must be left more or less to be settled by the railway companies and by the people themselves. Something may be done to teach the inhabitants of the towns how best to make use of their holidays, especially the bank holidays. But, after all, they will please themselves, and some will go to Epping Forest, while others will sit in the nearest tavern and drink

and drink, and drink; and, amongst those who are in Epping Forest, there will be some who feast their eyes on the beautiful trees and tender grass, while others will care for little beyond the ginger beer and the sticky sweets.

### PATENT MEDICINES.—No. 8.\*

MOTHER SEIGEL'S SYRUP; QUACK ADVERTISEMENTS AND TESTIMONIALS; "THE DOCTOR'S TERRIBLE MISTAKE" LIBEL CASE.

An American quack, who was ostentatiously boasting of his wealth in an hotel at Saratoga Springs, was addressed by an admiring auditor as follows:—"There must be a fortune in patent medicines." "I don't know," reflectively observed the quack; "it isn't all profit; bottles cost money." Any one not "in the know," would probably have added "and advertising" after "bottles." But the Yankee knew better than to mention this item, for he might as well have included his own mendacious tongue. He

\* The object of this series of articles is to give a complete account, with analyses, of the principal patent or quack medicines, and especially to bring about such a change in the Law of Patent Medicines that it shall become imperative upon their manufacturers to affix to every bottle or box in which these preparations are contained, a descriptive label fully setting forth the ingredients composing them. This regulation works admirably in various Continental countries. A systematic *exposé* of quack medicines has never before been attempted, and therefore, while thanking many friends who have given us encouragement in our task, we feel that we may reasonably ask for a continuance of their co-operation and support, and for any information bearing upon the subject. No. 1 of this series contained an article on Mattei's Electro-Homœopathic Remedies; No. 2, Clarke's Blood Mixture; No. 3, Chlorodyne and other opiates; No. 4, Du Barry's Revalenta Arabica; No. 5, Sequah's Oil and Prairie Flower Mixture; No. 6, Holloway's Pills and Ointment; No. 7, More about Holloway and Mattei; Allen's Hair Restorer, Mexican Hair Restorer, Singleton's Golden Ointment, Rowland's Kalydor, Gowland's Skin Lotion. In addition to the descriptions and analyses of these preparations, the articles will be found to contain a variety of interesting matter concerning quacks and quackery. Each number can be had separately by sending seven stamps to the publisher.

could not reckon advertising in the estimate of cost, for the plain reason that the more he spent in puffing his wares the greater would be the return in cash.

The amount of money spent on advertisements of quack medicines is somewhat astonishing. Thousands, tens of thousands, and hundreds of thousands of pounds are unhesitatingly launched upon this expenditure, the advertisers feeling certain of a profitable return for their outlay, and bearing in mind Carlyle's observation, "Great Britain contains so many millions of people — mostly fools"; and, for the matter of that, the same may be said of other countries when the blind credulity of people who pin their faith on quack medicines, merely because they have read some glowing advertisement (more or less false), is taken into consideration.

The Anglo-Saxon race used to be regarded as the most easily duped in this respect; the readiest swallows alike of quack advertisements and quack medicines. But the "heathen Chinee" runs the Englishman and American close in this respect; and, according to a recent article in the *Cornhill Magazine*, Chinese papers contain even a larger proportion of quack advertisements than English or American periodicals, which is certainly saying a great deal. Moreover, the ingenuity of the "Chinee," when he turns "quackee," puts the "barbarian devils," as he would doubtless term his European or American charlatan *confrères*, completely in the shade. They can only puff, while the Chinamen blow whole gales of lying assertions. Take, for instance, an announcement in the *Shén Pao*, or *Shanghai Gazette*, of the "Fairy Receipt for Lengthening Life." "This receipt," says the advertisement, "has come down to us from a physician of the Ming Dynasty. A certain official" (this *certain official* is somewhat vague) "was journeying in the hill country when he saw a woman passing southward over the mountains as if flying." (The name of this wonderful "record-

breaker" is, unfortunately, not given. Could she have been a Chinese "Mother Seigel?" "In her hand she held a stick, and she was pursuing an old fellow of a hundred years. The mandarin asked the woman, 'Why do you beat that old man?' 'He is my grandson,' she answered; 'I am 500 years old, and he is only 111; he will not properly take his medicine, and therefore I am beating him.' The mandarin alighted from his horse, and knelt down and did obeisance to her, saying, 'Give me, I pray you, this drug, that I may hand it down to posterity for the salvation of mankind.' Hence it got its name," adds the veracious quack. Whatever may be thought of the existence amongst us of lineal descendants of Ananias, no one can, after this, express any doubt as to the probability that a contingent of them must have found their way across the Asiatic continent to the land of the Celestials.

Reading further, we learn that this fairy medicine "will cure all affections of the five intestines and derangement of the seven emotions"—Chinese physiology is as wonderful as Chinese physic—and that it will speedily and effectually relieve every ailment under the sun. Here are directions for its administration, the dose being equal to a quarter of an ounce: "Take it for five days, and the body will feel light; take it for ten days, and your spirits will become brisk; for twenty days, and the voice will be strong and clear, and the hands and feet supple; for one year and white hairs will become black again, and you will move as though flying. Take it constantly and all troubles will vanish, and you will pass a long life without growing old." Price per bottle—our readers must not put the value of this elixir at too many thousands of pounds—3s. 3d.! After this specimen of quack announcements we shall expect to hear of a rush on the part of British patent medicine vendors to secure Chinese managers for their advertising departments, to spread their fame and increase the sale of their pills, potions, and plasters.

There are pessimists who insist upon the fact that there is no time like the past, that men of the present day are degenerate, physically and mentally, when compared with those of bygone times. Certainly, in the matter of hard lying the quacks of other days could almost give points, judging by four advertisements taken from a newspaper published in the early part of the last century. The first is "an incomparable pleasant tincture, to restore the sense of smelling, though lost for many years; a few drops of which"—the tincture, we presume—"being snuffed up the nose, infallibly"—at what date, we wonder, was this word first adopted by quacks?—"cure those who have lost their smell, let it"—the loss is meant, we suppose—"proceed from what cause soever." This marvellous stuff, at 2s. 6d. a bottle, was to be obtained only at Mr. Payne's toyshop (at the period of of which we are writing toyshops were not, as now, limited to the sale of toys, but were a kind of bazaar or emporium for many articles) at the "Angel and Crown, in St. Paul's Church-yard, near Cheapside." No. 2 was "an admirable confect, which assuredly cures stuttering or stammering in children or grown persons, though never so bad, causing them to speak distinct and freely without any trouble or difficulty." "Its stupendous effects are really wonderful," the advertisement concludes with, not omitting to mention that the confect can be secured, at the reasonable charge of half-a-crown a pot, at Mr. Osborn's toyshop, at the Rose and Crown, under St. Dunstan's Church, Fleet Street. The third preparation is a specific for "loss of memory or forgetfulness, certainly cured by a grateful electuary, peculiarly adapted for that end; it strikes at the prime cause, which few apprehend, of forgetfulness, makes the head clear and easy, the spirits free, active, and undisturbed, corroborates and revives all the noble faculties of the soul, such as thought, judgment, reason, and memory, which last in particular it so strengthens as to render that faculty exceedingly quick and good

beyond imagination, thereby enabling those whose memory was before almost totally lost to remember the minutest circumstance of their affairs, &c., to a wonder?" Mr. Payne retailed this miracle at 2s. 6d. a pot. What a pity it seems that it cannot now be got for love or money in these times of fierce competitive examinations! What an excellent and delicately suggestive present it would have been at Christmas, accompanying bills and "accounts delivered" sent out to long-winded debtors! No. 4 advertisement is that of "an assured cure for leanness, which proceeds from a cause which few know, but easily removed by an unparalleled specific tincture, which fortifies the stomach, purifies the blood, takes off fretfulness of the mind, occasions rest and easy sleep, and as certainly disposes and causes the body to thrive and become plump and fleshy, if" (was this "if" a sign of some mistrustfulness, or an artful bit of hedging?) "no manifest distemper afflicts the patients, as water will quench fire. It is also the best remedy in nature for all chronic diseases that take their rise from a bad digestion in the stomach, which this specific tincture infallibly rectifies, and thereby cures. It is pleasant to taste"—so are many undoubted cures for leanness—and that universal philanthropist of the last century, Payne, literally gave it away at his toyshop, with directions for use, charging only the ridiculously inadequate sum of 3s. 6d. a bottle. A reference to the pages of the London Post Office Directory discloses the fact that innumerable societies, occupying columns of small type, exist for almost every charitable object, dispatching missionaries here, there, and everywhere, sending pocket-handkerchiefs to the Polynesians, nick-nacks to New Guinea, samplers to Sarawak, lanterns to Labuan, female doctors to the Fijians, and so on; surely a sufficient sum could be raised to constitute an exploration fund, so that a search could be organised for Payne's prescription books. To show the store which we set by these lost treasures, and to demon-

strably prove that we are in earnest, we hereby undertake to add one shilling to every hundred pounds subscribed for this purpose.

"There is nothing new under the sun," exclaimed the ancient philosopher; and "History repeats itself" has grown into a recognised axiom. It is consequently no matter of surprise to find that a modern counterpart of what for distinction's sake we will call Payne's No. 4 exists in the widely advertised nostrum known as Mother Seigel's Syrup. Payne asserts that "bad digestion of the stomach" is the root of all diseases; while Mother Seigel, or rather the English proprietary trading in her name, insists, in a pamphlet lying before us, that "there is only *one* real disease, indigestion and dyspepsia." We do not wish to be too censorious, otherwise we might suggest that the conjunction "and" in this quotation destroys the force of the remark that "there is only *one* real disease" ("*one*" in italics too), but perhaps the author of the pamphlet meant to say "or." Whichever he or she intended to say, we say "Humbug." Elsewhere in the same pamphlet the writer speaks of "the intelligent persons who own these medicines." We have not the same opportunity—nor do we desire it—of examining into their or their writer's intelligence that we have of analysing their stuff; but, in face of the positive assertion that there is only one disease, we cannot wonder or complain, as the writer appears to do, that "there is more or less of an impression upon the minds of some people" (the intelligent owners excepted, of course) "that statements as to the merits and effects of popular medicines should be received with a degree of allowance." Very prettily put, we must say. Now, when it is so positively asserted that there is only one disease, is it quite consistent with such a statement, to issue with each bottle of syrup, a broadsheet containing an account of "the strange and prevailing disease of this country," printed in so many languages, from

Arabic down to Turkish, that "all countries" would have been nearer the mark. "Prevailing" certainly conveys the idea that from the writer's point of view other diseases may and do exist, though not to the same extent as that under discussion. Further, after enumerating a whole host of symptoms, "all, in turn, present,"—enough, as an American would say, to make a man mad on swallowing any nostrum, however nauseous, so that he may escape at least some of them, the writer goes on to say that "medical men have mistaken the nature of this disease. Some have treated it for" (query, "as") "a liver complaint, some for dyspepsia, others for kidney disease, etc., but none of the various kinds of treatment have been attended with success." None! Well, that is a poser; for if, as the writer has elsewhere told us, there is only one disease, and that disease, dyspepsia, it is singular that medical men should all have failed in their diagnosis when they treated the patient—not the disease, as the writer has put it—for dyspepsia. But a ray of intelligence has just darted into our mind, although we are not proprietors of any patent medicines. Perhaps the writer is not so particular, after all, in his desire to inculcate the doctrine that there is only one disease as he is to impress upon his readers that there is only one remedy for all diseases, and that that remedy is Seigel's Syrup. The medical men whom he has so unsparingly and indiscriminately attacked, in the cause of Truth (and Seigel), omitted to give this remedy to their unfortunate patients; hence, he wishes Seigel's customers to infer, their failure.

Our readers must be getting into a state of feverish anxiety to learn the composition of this wonderful medicine, this "Nature's secret," as the Seigel pamphleteer modestly styles it in the panegyric with which he introduces a number of testimonials from persons who, "of their own accord" (the pamphlet does not enlighten us as to whether also at their own

expense), have come forward to make declarations before magistrates or commissioners (not such a remarkable or difficult thing) "with no other motive than the noble one of letting other sufferers know where help is to be had in the time of need." Mr. Stokes, public analyst for Paddington and other important metropolitan districts, has unveiled "Nature's secret," and we present his report:—

Analytical Laboratory,  
Vestry Hall, Paddington Green, W.,  
18th Sept. 1891.

Dear Sir,—On Sept. 7th I received from you a sample of "Mother Seigel's Syrup." This was in a four-ounce bottle, in its unopened wrappers, and still sealed with the unbroken stamp of the Inland Revenue bearing the words, "A. J. White, Limited, London."

This sample I have now carefully examined, chemically and microscopically.

I find it to be a complex mixture, containing treacle, borax, aloes, capsicum, and liquorice.

The active ingredient is aloes, of which I extracted from the 4 oz. mixture 120 grains.

I remain, yours faithfully,

ALF. W. STOKES, F.C.S., F.I.C.  
(Public Analyst).

To the Editor of HYGIENE.

Aloes to right of them, aloes to left of them,  
Aloes ——

We must really apologise to the Poet Laureate and to our readers for thus abruptly bursting into a parody of Tennyson's beautiful verses. Our emotion was for the moment too great to be expressed in plain prose. Perhaps, too, our writing on Patent Medicines brought the "Valley of Death" of Tennyson's poem into our mind. We had just come across an old acquaintance, whose name has repeatedly occurred in this series of articles; we will not say a *dear* old acquaintance, as it is not an expensive drug. Moreover, we felt that we were getting nearer to the discovery of the Philosopher's Stone, the universal panacea as offered to suffering humanity by the principal

patent medicine proprietors, "intelligent persons," without doubt (*vide* the Seigel pamphlet). If we must not break out into verse, we would beg at least the favour of being permitted to indulge in capitals. ALOES, "in the name of the *profit*, ALOES," ALOES heads the poll. As those of our readers who have perused our previous articles will remember, aloes enters largely into Holloway's pills; under the *alias* of "Prairie Flower," it forms the chief component of Sequah's mixture; and now we learn, on the authority of Mr. Stokes, that aloes is the active ingredient of Mother Seigel's syrup. We may here note a peculiar fact which scarcely goes to support the "intelligent" theory of the Seigel pamphleteer, namely, that there seems to exist in the minds of patent medicine proprietors a delusion that the growth of aloes is confined to the United States, whereas nearly the whole supply is imported from the West Indies.

Amongst the testimonials contained in the pamphlet before us, we cannot find one which the proprietors of Seigel's syrup made most extensive use of up to a few months ago. It was that given by a railway guard named Perrin, and alleged that, prior to his taking Seigel's syrup, Perrin had consulted Dr. Dacre Fox, a well known medical practitioner, formerly at Manchester, and afterwards of Leeds and elsewhere, who made serious errors in diagnosing and treating his case, almost resulting in fatal consequences. The publication of these injurious and untrue statements having been brought under Dr. Fox's notice, he was compelled, in self-vindication, to adopt legal measures. Upon his solicitors writing to the proprietors of Seigel's Syrup, the only answers that could be obtained from the proprietors' solicitors were that the advertisement containing the guard's testimonial referred to the "late Dr. Dacre Fox," and that the date therein given (under declaration, be it observed) was wrong, as it should have been 1877 instead of 1887. Eventually the matter came into a court of law, and was tried at Leeds before Mr. Justice

Lawrence, last December; Mr. E. Tindal Atkinson, Q.C., and Mr. Scott Fox being counsel for Dr. Fox, while Mr. Waddy, Q.C., Mr. Walton, Q.C., and Mr. Robert Wallace appeared for the defendant company, A. J. White, Limited, the proprietors of Seigel's Syrup. In the course of the trial it transpired that the statements made by Perrin were incorrect, that Dr. Fox had not given any such opinion and certificate as had been imputed to him, and that a chemist named Levi Todd, agent at Manchester for the defendants, had taken down Perrin's statement, and forwarded it to the defendants. In cross-examination Todd admitted that, when sending his report on Perrin's statement to the defendants, he wrote, "I have kept within substantial facts; you can make them as strong as you like." The defendants then published Perrin's statement, under the startling heading of "The Doctor's Terrible Mistake." The result of the trial, which lasted two days, was that, after the judge's summing-up, the jury, after only twenty minutes' absence, gave a verdict for the plaintiff, damages £1,000. It is worthy of notice, as throwing a side-light upon the enormous extent to which patent medicines are advertised, that the evidence showed that no fewer than 7,500,000 (seven millions, five hundred thousand) copies of a pamphlet containing the libel had been circulated.

It may also be mentioned that Perrin, the guard, admitted that he had received various remittances from the defendants, viz., £2, £2, £3, and £7, to compensate him for postages in answering letters of inquiry. "I had no idea," he wrote, in a letter to the defendants, "you would have gone so far in the matter when your representative waited on me." "Waited" on him, for the purpose of eliciting the particulars of the libellous statement. Is this to be regarded as a specimen of declarations made "of the patient's own accord?" We always thought up to now that guards and other railway officials complained of being over-

worked in their daily duties. How can that be if one of their number can find sufficient leisure to write such a mass of letters as to involve a disbursement of £14 for postages?

The defendants subsequently obtained stay of execution by paying £1,000 into court, pending an appeal, which was heard in the Court of Appeal before Lords Justices Lindley, Bowen, and Kay. On the conclusion of the arguments Lord Justice Lindley, in giving judgment, commented severely on the conduct of the defendants. It certainly appeared to him that the defendants had published the libel under the impression that the plaintiff who was described in it as "the late Dr. Dacre Fox" was really dead, and that they would be perfectly safe inasmuch as the person libelled was dead and could not turn up against them. Unfortunately for them, Dr. Fox was alive, and instituted an action. The defendants, instead of apologising and admitting that they had made a mistake, tried to justify the libel, which they unquestionably failed to do. There was not a tittle of evidence to show that Dr. Fox had been guilty of the conduct which they imputed to him. The whole object of the libel was to puff the defendants' wares, and they went out of the way to libel him for the purpose of puffing their own quack medicines. They were utterly unscrupulous as to the means taken by them, so unscrupulous that they did not shrink from casting blame upon a person supposed to be dead. The court saw no reason to either grant a new trial, or reduce the damages; therefore the appeal would be dismissed with costs. Lord Justices Bowen and Kay concurred in this decision.

In conclusion, we would refer to one matter which we passed over in an earlier part of this article. It seems to us a curious circumstance that when a common commercial substance like aloes is required for making a quack nostrum, such great care and expense are alleged to be necessary for the cultivation of the plant and the preparation of the drug. The makers of

the Sequah Prairie Flower Mixture profess to ransack the extensive woods and plains of the Far West in search of the vegetable extract (aloes) used in its composition; and the proprietors of Seigel's Syrup print on their wrappers the following statement:—"The manufacturers of this medicine have been for fifty years the largest gatherers of roots, barks, and herbs in the world. Their botanical gardens are the most extensive in America." Why, one may reasonably inquire, do these "intelligent persons" take the trouble to gather and grow thus largely such simples as aloes, capsicum, treacle, and liquorice, which could be readily purchased in tons of any wholesale druggist? And, by-the-by, we would remark that, notwithstanding a fair knowledge of the United States, as the result both of personal travel and of reading, we are absolutely ignorant of the locality in which the extensive botanical gardens are situated. The address (America) given on the wrappers is as much too vague as many of the assertions thereon are much too positive.

THE EDITOR.

#### ENGINEERING IN RELATION TO HYGIENE.\*

By Sir JOHN COODE, K.C.M.G.

It is my first duty, and I esteem it at the same time to be my great privilege, to offer, as I now do, on behalf of the English members of the Engineering Section, a cordial welcome to those brethren of our profession who have come among us from afar in order to be present at this Seventh International Congress of Hygiene and Demography.

It has been, I can assure you, the anxious desire of the Organising Committee to provide such papers as will contribute to the advancement of the knowledge of hygiene in all its branches.

Of both the scope and the importance of

\* The Presidential Address in the Engineering Section of the Congress of Hygiene

the subject with which the Congress has taken upon itself to deal, there cannot surely be two opinions. Having for its principal—or rather it may be said for its sole—aim and object the preservation of health (or, in other words, the prevention rather than the cure of disease) the subject of hygiene may well occupy the attention, and claim the interest, of all who desire the welfare of the human race.

As we, the British members, are well assured, it is because the object of this gathering is one which is in an especial degree calculated to benefit the community at large, that it enjoys the patronage of our honoured and beloved Sovereign Queen Victoria, and that it is supported by the presidency of the Prince of Wales; by his presence at our opening meeting, His Royal Highness has given indubitable proof that he feels a genuine interest in the success of the cause which we all have at heart.

It will not, it is to be hoped, be devoid of interest, if I here offer a few remarks on the progress of modern legislation in this country in respect of sanitary matters.

About the year 1838 the public mind of Great Britain became first aroused, so to speak, to the serious and growing evils arising from the absence of proper precautions for the preservation of the health of the dwellers in our large towns and cities generally, and more especially in this metropolis in which we are now assembled.

Between 1838 and 1848, the question of Public Health in the United Kingdom was dealt with in the course of frequent debates and discussions in Parliament; it also formed the subject of inquiries by Committees and Commissions. At the end of that decade these investigations and discussions culminated in the establishment of an entirely new department, which was entitled the "General Board of Health"; a few years later on that body was superseded by an Act of the Legislature, under which the important Department of the "Local Government Board" was created.

Many names might be mentioned in connection with the work of the two decades just adverted to, but amongst them there stands out most prominently that of one man, the late Sir Edwin Chadwick, whose untiring zeal and well-directed labours contributed more than those of any other single individual to the success of this great movement, and to the adoption of those important measures which have conduced in so great a degree to the improvement of public health in this country.

When speaking to a body of civil engineers, as I have now the honour of doing, it would be remiss to omit to mention the name of another gentleman, whom we have the privilege of including in our list of vice-presidents; I refer, of course, to Sir Robert Rawlinson; his eminent services, first in the organisation, and, secondly, in the direction for many years, of the Engineering Department of the Local Government Board, have deservedly received the marked approval of the Sovereign.

The importance of a correct knowledge of the laws of hygiene being granted, this importance becomes accentuated in every place where human beings are congregated together in considerable numbers, as in the case of large towns and cities, the greatest and most notable example of which is this mighty metropolis, this "City of Immensity," as it has well been called.

Is there not therefore a peculiar fitness in the holding of this Hygienic Congress in London, which contains the greatest congregation of human beings the world has even seen.

Permit me to mention a fact or two which may serve to give some of those whom I now address a more exact idea of the magnitude of this London of ours.

The population of the metropolis is, in round figures, 5,670,000, a number which is well nigh appalling to those who can form an adequate conception of its magnitude; its vastness will perhaps be somewhat better realised by my stating the fact that it is considerably greater than the numbers of the inhabitants of the

cities of Paris, of Berlin, of Vienna, and of Rome all combined.

As a matter which cannot fail to be of special interest to engineers, let us turn for a moment and see what has been done in the way of works that have been executed for the special purpose of improving the health of London.

The main intercepting and principal branch sewers which have been constructed for the conveyance of the sewage of London to the two outfalls into the River Thames, at Barking and Crossness respectively, measure about 80 English miles, equal to 130 kilometres.

Since the year, 1856, when the now extinct "Metropolitan Board of Works" was formed, there has been expended on the main drainage works alone the sum of nearly £6,000,000 (120,000,000 marks or 150,000,000 francs).

As a by no means unimportant factor among the changes which in modern times, have resulted in the better health of our capital city, a reference to the supply of water of improved quality, and in larger quantity must not be altogether omitted. Up to the end of 1890 the several companies (eight in number) had expended upon works for the supply of water to London, a sum very closely approximating to £15,000,000 [300,000,000 marks or 375,000,000 francs].

The average quantity of water delivered last year to the inhabitants of London for domestic purposes alone, was 24·75 gallons per head of population per diem, and in respect of quality but little, if at all, surpassed by that supplied to any other city in Europe; this water is conveyed through pipes, the united length of which is about 4,760 miles.

The total volume of water delivered for domestic purposes only in 1890 was 64,000,000,000 gallons [290,623,000 cubic metres]. For raising this large quantity the companies employed no less than 184 steam pumping engines, having an aggregate of 21,659 horse power.

As another illustration of the magnitude of London it may be mentioned that the streets

and roads within the metropolis, if placed end to end in one continuous line, would measure about 2,500 miles, equal to the distance from London to Land's End, and thence across the Atlantic Ocean to the mouth of the Gulf of St. Lawrence to Canada on the west, or going eastward, would extend across the entire Continent of Europe, and beyond the Ural Mountains into Asia.

Whilst admitting that great benefits have accrued from the extensive drainage works which have been executed, and the large expenditure that has been incurred for improving the health of London, it cannot yet, by any means, be said that all has been accomplished which might be done in this direction. Nor will it be possible to say as much so long as the sewage of the metropolis is allowed to flow into any part of the Thames without previous purification by the most perfect method as yet known, *i.e.*, by being filtered through land. The only alternative would seem to be the conveyance of the sewage to the sea coast beyond the mouth of the estuary of the Thames.

Nevertheless, and notwithstanding the room which exists for the further improvement in the disposal of its sewage, the reduction which has been brought about in the death-rate of London in modern times is as noteworthy as it is satisfactory. A few facts will show the benefits that have arisen from the better understanding, and the more effectual application, of the laws of hygiene in our metropolis.

In the latter half of the seventeenth century the average mortality of London is said to have been not less than 80 per 1,000; at the end of the eighteenth century it had dropped to 50 per 1,000; in the decade ending in 1850 it was 25 per 1,000; in that ending in 1870 it was 24 per 1,000; whilst in that ending in 1890 it had further fallen to 19·8 per 1,000.

It is gratifying to note that for the year 1889, taken *per se*, the rate was as low as 17·4 per 1,000, and there is no reason for supposing that it would not have been equally low for the year

1890, had it not been for the unfortunate epidemic of influenza which then prevailed, in consequence of which it rose in 1890 to the same proportion as that at which it stood in the early part of the last decade, viz., 20·3 per 1,000.

## CREMATION AND BURIAL.

### ON RECENT PROPOSALS RELATING TO BURIAL AND CREMATION, AND THE IMPORTANCE OF DISINFECTING THE BODIES OF ALL PERSONS DYING FROM INFECTIOUS DISEASE, WITH REMARKS ON THE PRESENT SYSTEM OF CERTIFYING THE CAUSE OF DEATH.\*

By Sir HENRY THOMPSON, M.B., F.R.C.S.

I PROPOSE to assume, in order not to occupy unnecessarily your valuable time, that there can be little or no difference of opinion regarding the accuracy of the following proposition—that the bodies of those who have recently died by any, or almost any, of the diseases generally known as “zymotic,” and thus classified by the Registrar-General in this country, are charged with elements which have the property of communicating the same diseases to the bodies of living persons if brought into contact with them, whether by inoculation or by food admixture.

The group of diseases defined as “zymotic” is generally held to be formed chiefly by the following:—Small-pox, measles, scarlet fever, diphtheria, whooping cough, typhus, enteric and continued fevers, with some forms of diarrhoea and cholera. In considering the mortality from these diseases, occurring under ordinary circumstances in this country, it will be desirable first to state what is the mortality arising from all causes, and then to ascertain the proportion which the group in question bears to the total. The official reports of the Registrar-General for the last three years will show this, extracts

having been prepared for the purpose. No special outbreak took place, and the average was rather lower than had previously been recorded.

It appears that the mean mortality from zymotic diseases during the last three years amounts to 68,382 per annum in England and Wales alone. Of this large proportion—namely, more than one-eighth of the total mortality—it must be pointed out that each case was not merely a focus of infection while living, but was capable of actively propagating disease after death. At that period this activity is at its *maximum*, becoming less from various chemical changes which follow their natural course afterwards, largely, no doubt, through oxidation from exposure, the nature of some of these changes not having yet been completely studied and ascertained.

For the sake of the living and healthy population the question of rendering those dead by zymotic diseases innocuous is one of supreme importance. The nearly 69,000 foci of communicable disease scattered annually throughout our country cannot fail to extend injurious influences to others. It is not too much to say that this large number of deaths from maladies which are mostly preventable is itself partly due to the fact that the dead body is permitted to propagate disease to the living. Could we arrest at once and completely the injuriously active forces which prevail it a marked diminution would be apparent in the progress of many a local pestilence.

Questions touching the isolation of cases during illness, their sanitary condition, and the employment of disinfectants during life have hitherto largely occupied the public as well as the medical profession, and their study has been followed by remarkably successful results. Illustrations of these it will be wholly superfluous for me to adduce. The management of infectious disease during life is not within our scope to-day.

The question here before us is, “What is the

\* A paper read at the Congress of Hygiene (State Medicine Section).

best mode of arresting the progress of infection when death occurs so that the diseased remains shall not injure the living, whose right to protection is now the all-important consideration?" A long experience has demonstrated that all methods of dealing with the dead body which have for their object its conservation entire, when charged with infectious elements, permit these to be disseminated, and have often occasioned fresh outbreaks, especially in periods of epidemic visitation.

The intricate, continuous, and universally pervading natural network of watercourses beneath the surface of the soil, associated as it is with innumerable artificial wells, reservoirs, and channels of every description for distributing water and collecting sewage, form a system, unseen, yet scarcely imaginable in regard of its extent, by those who have not practically studied it and realised the complexity of its ramifications. In a densely-populated country this system presents perhaps the most formidable social health problem which the sanitarian has to encounter. The history of the chief epidemics of the last 60 years in this country and of the local outbreaks of fever, diphtheria, scarlet fever, small-pox, &c., offer innumerable examples of propagation and extension of these diseases, due mainly, if not entirely, to the failure to prevent poisoning of the watercourses, not only by excreta during life, but by dead bodies committed to the soil—bodies which are deposited there solely in obedience to the sentiment that it is necessary to preserve the integrity of their form and the unaltered condition of their elements—elements at that moment so destructive and so mobile. I have no need to dilate on these facts; their fatal influence is a part of our national history.

On the other hand I shall not ignore the fact that diseased bodies may, in certain soils, in exceptionally favourable situations, be deposited with the object just named, and that in the course of three or four years, perhaps, the chief danger may be dissipated without ascertainable

harm to others. Extreme precautions must always be taken to preserve the encroachment of population on these favoured spots, or no hope of their harmlessness can be maintained. Then in these light, dry soils and elevated spots, the most salubrious, by the way, that we possess for human habitation, for which purpose, so long as they are used as burying-grounds, they are totally disqualified, it may be feasible to adopt interment in perishable coffins or in close contact with the soil itself, and thus insure the quicker process of decomposition of the body than occurs in heavier soil, or when it is confined in the more solid coffins hitherto employed.

But it ought never to be forgotten that the perishable coffin, if safe in exceptional circumstances, becomes most dangerous in burying-grounds where any communication exists with the great network of watercourses described, and always associated with populous districts. It is during the early weeks or months which follow death that the poison of the diseased body is at its *maximum*, both as regards force and quantity. You open wide the doors for the exit of such infection when you bury that body in a basket or in a perishable envelope. Better even in the interest of the living that you placed it in the much-abused lead coffin, offensive as the results of changes which take place in these sealed interiors are when opened. For we have at least the right to doubt whether specific morbid germs survive for many years the remarkable organic transformation which slowly takes place within the lead coffin.

All, then, that I contend for is this—that, whatever form of dealing with the dead you adopt which demands as its primary condition the preservation of the body entire, some risk to the living is associated therewith. The risk may be minimised by certain precautions, but its amount is only a question of degree. It may be formidable and produce lamentable results when interment is intramural, as many living witnesses can testify, since it was a custom not

many years ago universally followed. It is less considerable, but is often manifest in confined suburban districts, but particularly where the central concourse of inhabitants is a rapidly increasing one.

The risks and its results are obvious in many country churchyards, especially in low-lying districts, on the borders of rivers and waterways, naturally, for manifold reasons, the favourite haunts of population. Such situations form, in fact, the sites occupied by the largest part of our rural inhabitants and by almost all our towns. Finally, the risk is small when confined to outlying uninhabited districts with a peculiarly favourable soil. But who shall say when the *minimum* of risk at present there existing shall not in our populous country become manifestly greater?

Now in regard to the nearly 69,000 bodies dying of zymotic diseases, let it be observed that few of these are within reach of a choice and almost safe locality. On the contrary they are scattered throughout the kingdom, and the majority are necessarily interred in places where the germs of disease can be readily carried into the currents of the great water systems referred to. With these existing facts before us, we have moreover to provide for an increasing population and for increasing occupation of the land best adapted for the purposes of habitation. I have recently proposed, therefore, that everybody dying of zymotic disease should be at once absolutely disinfected—rendered incapable of extending it—that is, as soon as possible after death, having due regard to convenience and decorum.

I know only one mode of effecting this object—namely, by submitting the body to a sufficiently high temperature. Placed in a chamber heated to something like 1,500° F., about 800° C., all the fluid and gaseous matters are volatilised and escape as innocuous gases. The residue is a heap of dry white ash, absolutely harmless. An hour suffices to complete the operation, and it is in fact a process of

complete desiccation and disinfection by heat. When the process is conducted in a furnace it is popularly spoken of as “cremation.”

The method above described, however, constitutes the best and simplest way of accomplishing the end proposed, there being no contact with burning fuel or applied flame. I adopted it as an experiment for the first time as long ago as in 1874 by means of a Siemens furnace, and thus reduced a body containing a large proportion of adipose tissue, and weighing about 110 kilogrammes in less than an hour, the pure white ashes weighing less than two-and-a-half kilogrammes.

The cost of the proper apparatus, and the necessity for a full supply of gas by which the heat is obtained, compelled the Cremation Society of England at first, following the example of the society at Milan, to employ a reverberating furnace, the most approved form of which is now adopted at Woking, and with admirable results. But the remarkable success which has followed the society's operations renders it probable that before long the system now referred to will also be in operation and conducted under their auspices. It is this process of disinfection by high temperature that I now propose should be applied to all bodies certified to have died of infectious disease, as an act of wise precaution and just regard for the interests of the living.

There is one other course which might be followed, less trustworthy than the preceding, but infinitely more so than burial in the most favourable soil. This is the use of a capacious coffin, embedding the body therein with a large quantity of quicklime, so as to fill the receptacle completely, and then burying in the usual manner.

I now arrive at the latter and subordinate section of my paper, the subject arising necessarily and logically from what has gone before. In contemplating the gradually increasing preference for cremation to burial which is being manifested, especially among the educated

classes both in this country and abroad, and particularly in view of the proposal to desiccate and disinfect by heat certain diseased bodies, which I advocate here to-day, it is essential to demand, at the same time, that the official determination of the causes of death should in all cases be more complete than it has hitherto been in this country. I refer you to the extracts from the Registrar-General's reports to show that in England and Wales some 15,000 deaths occur every year—about three per cent.—the causes of which have not been investigated or certified by any person. In Scotland the proportion is far larger. Even in the city of Edinburgh the uncertified deaths in the last report issued amounted to no less than 10 per cent.

Fully qualified medical men—an officer of health, for example, is now to be found in almost every locality, with a district under his supervision—should be appointed so as to embrace the entire urban and country populations. His duty should be to examine and certify in every case of death, making an autopsy where desirable, determining whether a coroner's inquest is necessary, and certifying when he is completely satisfied that death has occurred from natural causes. When this officer has thus certified, cremation is to be permissible. Lastly, he should advise, and in time may probably be empowered to enforce, after death by infectious disease, the use of quick-lime, as above described, in districts without a crematory, or the process by heat where one exists.

In France, Germany, and other Continental nations, an appointed examiner has long exercised the function described. In this country a certificate of death is given by the medical attendant of the deceased, if there be one. In many instances there is none; or the attendance has been insufficient to supply evidence of much value, and the duty is often discharged in a perfunctory manner unless a coroner's inquest is held, when the cause of death is carefully investigated.

I have said nothing relative to the employment of exposure to high temperature or cremation as a desirable process after death in all cases, instead of interment in earth. But it is impossible to resist the belief that the former would be preferable from a sanitary point of view. The argument which appears to me wholly irresistible in relation to bodies deceased from infectious diseases is only by some degrees less weighty in regard to death by all other causes. Putrefying animal matter is always noxious, and may be dangerous to the living; the process of desiccation and disinfection in earth must in any case occupy years for its accomplishment, and during the first period of the term much harm may arise. The unseen and lengthy process of putrefaction in the grave is one the details of which are too revolting to be illustrated by any verbal description. On the other hand, the action of heat speedily converts the constituents of the body, healthy and diseased alike, into innocuous gases, which escape, without trace of smoke, odour, or offence, into the atmosphere, and into the white earthy ash already described. The atmosphere yields these gases at once to vegetable growths, which increase by absorbing them.

Finally, by this means, two great advantages are secured to the public. First, a diseased dead body is rendered incapable of communicating any malady to the living. Secondly, the assignment of large and desirable tracts of land throughout the country for the imperfect and sometimes hazardous process of purification by burial in earth is rendered needless. Every acre hitherto thus devoted may, in process of time, be made free for the production of food; or in thickly-populated neighbourhoods, as open spaces for exercise and recreation, may be set apart for ever to promote and maintain the public health.

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After Sir Henry Thompson's communication was concluded, the following paper was read, in the same section.

## ON BURIAL IN EARTH.

BY F. SEYMOUR HADEN, F.R.C.S.

(Abstract.)

THIS paper was founded on six propositions, and on the conclusions (a), (b), (c), which follow them, viz.:—(1) That the natural destination of all organized bodies that have lived and that die on the earth's surface is the earth. (2) That the evils which the cremationists declare to be inseparable from the principle of interment are independent of that principle, and are of our own creation. (3) That the source of these evils is to be found, not in the burial of the dead, but in the unreasoning sentiment which prompts us to keep them unburied as long as possible, and then to bury them in such a way that the earth can have no access to them. (4) That the principle of burial supposes the resolution of the body by the agency of the earth to which we commit it, and that the earth is competent to effect that resolution, and to effect it innocuously. (5) That to seek to prevent the beneficent agency of the earth by enclosing the dead in imperishable coffins, brick graves, and vaults, is in the highest degree irrational, since it engages us in a vain resistance to an inevitable dispensation, and has led us to accumulate in our midst a vast store of human remains in every stage and condition of decay. (6) That the remedy for such evils is not in cremation, but in a sensible recognition of, and a timely submission to, a well-defined law of nature, and in legislative action to enforce the provisions of that law. Cremation, which is unnecessary and, in a medico-legal sense, dangerous, should, as a measure of public safety, be declared a misdemeanour; and the whole subject of its management should be deferred and dealt with by a Bill, which should contain the following provisions:—(a) For burial within the earth as the only legal mode of disposing of a dead body. (b) For a limitation of time beyond which it should be illegal to keep a dead body unburied.

(c) For the illegality of strong coffins, brick graves, and vaults, and of all contrivances having for their effect to retard resolution, and to confer on the dead a tenure, practically illimitable, of the soil which is necessary to the purposes of the living.

After considerable animated discussion, and the reading of two papers on Cremation by Professor Brouardel, and Mons. Cafford, of Paris, advocating cremation, the following resolution was proposed by Sir Henry Thompson, and seconded by Mr. Ernest Hart:—“That the cremation of the dead is a rational and hygienic procedure, which is especially called for where death has occurred from infectious disease.” This was carried by acclamation, only four members voting against it, out of the very crowded assembly.

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### THE PRESENT STATE OF OUR KNOWLEDGE CONCERNING THE SELF-PURIFICATION OF RIVERS.\*

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By PERCY F. FRANKLAND, Ph.D., B.Sc. (Lond.), F.R.S., Professor of Chemistry in the University of St. Andrews, Dundee.

THERE is perhaps no controversial matter connected with the hygiene of water-supply to which engineers have so frequently had their attention directed as that of the self-purification of river-water. Although it is a subject on which most water engineers have a very decided opinion, the present occasion appears to me particularly favourable for reviewing the whole question by the light of the most recent information, especially as we have the benefit of the presence of a number of distinguished colleagues from abroad, whose opinions on this much-vexed topic will be very welcome.

The subject of the self-purification of rivers admits of being considered from two perfectly distinct points of view, as indeed do almost all

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\* A Paper read before the Congress of Hygiene.

other questions relating to the purity of water, viz., the chemical and the biological aspect.

Inasmuch as the organic impurities—and the controversy, of course, only refers to organic impurity—gaining access to rivers may be either devoid of life and unorganised, or living and organised, their discussion is in the one case a chemical and in the other case a biological question. Until recently the subject has been only discussed from a chemical point of view in consequence of the impossibility which formerly existed of obtaining any precise or accurate information on such matters of biology.

The firm conviction possessed by many, that rivers undergo spontaneous purification in the course of their flow, is generally based upon personal observations made upon streams in which the process appears to be going on in such a striking manner that no analytical evidence is required. All engineers are acquainted with streams which are visibly polluted at one spot and apparently pure a few miles lower down. When such cases are further submitted to analytical tests, the latter, of course, fully confirm the previous ocular impressions. In fact, that such disappearance of organic matter does take place is beyond all shadow of a doubt, and it is mere waste of time to contest it. A bag full of feathers shaken into the air at one spot would similarly be imperceptible a few hundred yards away. That the polluting matter has been destroyed, however, in the course of a few miles' flow is almost as improbable as that the feathers should have been decomposed in their short flight through the air. In fact, when these cases of supposed self-purification come to be carefully investigated, it becomes very doubtful as to whether the phenomenon is due to anything beyond dilution and sedimentation. The careful experiments which have been made to test this point are by no means numerous. A series of investigations were made by the

Rivers Pollution Commissioners of 1868 to test the point both as regards highly polluted streams such as the Irwell, Mersey, and Darwen, and comparatively pure ones like the Thames, but in both cases their results were of a negative character and pointed to no real purification, *i.e.*, destruction of organic matter, although there was distinct evidence of considerable improvement in the quality of the water through sedimentation.

Some years ago I undertook a series of experiments to further test this point in connection with the Thames, which has always been regarded by some as a river possessed of most remarkable self-purifying power, and which undoubtedly often does reach London, after a long flow through a cultivated and fairly populated district, in a surprisingly pure state. The experiments in question consisted in taking samples of the water flowing in the river at different points on the same day, with a view to establishing whether on the whole the chemical quality of the water was improved or deteriorated during the course of its long flow. Thus on one day samples were taken at Oxford, Reading, Windsor, and Hampton; on another day at Chertsey and at Hampton; and on three different occasions samples were collected both at Windsor and at Hampton on the same day. The results of analysis of these various samples are recorded in the accompanying table, whilst the following diagram summarises these results and clearly indicates that the chemical quality of the water undergoes slight but almost continuous deterioration in flowing from Oxford to Hampton. It must be remembered that this deterioration is in spite of a very large increase in the volume of the water, a large proportion of which gains access to the river from springs in the chalk, and is of the very highest purity. Thus, Mr. Thornhill Harrison, C.E., has determined that the total increase in volume in the Thames between Maidenhead and Thames Ditton was (exclusive of the Colne, Wey, and Mole):—

In April, 1884 .....	249,500,000	gallons per day.
On July 8, 1884 ...	49,000,000	" "
July 22 to 26 .....	131,000,000	" "
November, 1890 ...	45,000,000	" "
(Harrison on "Subterranean Chalk Water," Inst. Civ. Engineers, 1891.)		

In the above-mentioned experiments I purposely limited the scope of my enquiry to the dissolved organic matter so as to avoid the complications arising from the suspended matters, concerning the removal of which by sedimentation there is no dispute; on this account all the above samples were filtered through Swedish paper before analysis. Indeed, it cannot be too strongly pointed out that unless the questions of dissolved and suspended matters are kept wholly distinct in these investigations, no reliance whatever can be placed upon the results. The idea of any striking destruction of organic matter during the river's flow receives no sort of support from my experiments; the evidence is, in fact, wholly opposed to any such supposition.

I have also had an opportunity of making a somewhat similar experiment on the flow of the Ure and Ouse above York. In this experiment also there is not the slightest support to the theory of self-purification. Nor is there any diminution in the number of microbes during the observed flow.

Of foreign investigations on the same subject, there are those of Hulwa on the Oder at Breslau (*Chemical News*, 1884, 104) (Biedermann's *Centralblat f. Agrikulturchemie*, XIII., Part I.), of Frank on the Spree at Berlin (*Zeitsch f. Hygiene*, 1887, III., 355), and of Prausnitz on the Isar at Munich (*Centralblatt f. Bakter*, 1890, VII., 404).

Of these investigators, Hulwa professes to have traced the complete purification of the Oder from the sewage of Breslau after a flow thirty-four kilometres. It is impossible to make any knowledge of these results without a knowledge of the changes which the volume of water in the river undergoes during the flow.

A most complete description of the condition of

the Spree during its flow from Berlin to Potsdam is given by Frank, full account being taken of the changes in volume during the course. The results arrived at by Frank are, however, very different from those of Hulwa, for Frank maintains that the change in chemical composition is very insignificant throughout, but that the number of microbes undergoes a most striking diminution during the flow, a result which he naturally attributes to sedimentation. Already in 1885, I had myself ("On the Removal of Micro-Organisms from Water," *Proceedings, Royal Society*, 1885, No. 238), shown to what an astonishing extent micro-organisms are removed in the subsidence of solid particles; this I had proved not only in the case of laboratory experiments made with the most varied materials, but also on the large scale in the softening of water by Clarke's process. The disappearance of the microbes in the water of the Spree during its sluggish flow through the lake-like extension which it forms after junction with the Havel at Spandau above Potsdam, is obviously due to causes of a similar kind.

In Prausnitz, experiments on the Isar at Munich, there is the same disappearance of microbes during the flow, which is again attributed to sedimentation.

A careful study, therefore, of these most recent investigations leads us to the inevitable conclusion that sedimentation is the main cause of any self-purification in river-water; of any rapid oxidation of dissolved organic matter, there is still no reliable evidence, although of course dilution which frequently takes place on the largest scale, as in the case of the Thames, without being suspected until made the subject of a most careful scrutiny, will produce a superficial appearance of such a result.

This removal of microbes by sedimentation during the flow of a river is unquestionably of great hygienic importance, and of much greater hygienic importance than the alleged oxidation of dissolved organic matter, which in itself can have no power of communicating zymotic

disease; it is, however, a process which cannot be relied upon as furnishing any guarantee that harmful microbes turned into a stream at a given point will no longer be present in the water at any point lower down. From the numerous experiments which have been made on the vitality of pathogenic microbes in water, there can be no doubt that many forms which might have subsided, as above indicated, would remain alive for long periods of time, and be carried down uninjured when the river was next in flood. Indeed, recent experiments of Lortet ("The Pathogenic Bacteria of the Mud of the Lake of Geneva," *Centralb. f. B.* IX., 709), have shown that such deposits formed in lakes actually and not unfrequently contain pathogenic forms in a state of vitality.

We must not allow, therefore, this sedimentation of microbes to cause us to relax our protective measures to exclude contamination from our streams; but, on the contrary, bacteriological research clearly indicates, on the one hand, the value and importance of purifying, by the very best available means, all dangerous liquids, such as sewage, before admission into the rivers; and, on the other hand, of submitting the water drawn from the streams for town supply, to the most careful subsidence and filtration through sand before delivery.

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### BLOCK DWELLINGS FOR THE INDUSTRIAL CLASSES.

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BY JOHN F. J. SYKES, B.Sc., M.B., Medical Officer of Health for St. Pancras.

Of all the classes into which the people may be divided, those that give rise to the most difficult sanitary, social, and economic problems are, proceeding from below upwards, the pauper, the residuum, and the working classes. The housing of the pauper is undertaken by the State; the distinguished efforts of Miss Octavia Hill and other philanthropists are directed towards ameliorating the dwellings and habits of the residuum, the most difficult class

to deal with from the variability of type and condition; whilst public companies and private individuals are engaged in constructing improved dwellings to house the working classes and gather them out from herding in tenement houses among the residuum.

In order to keep within reasonable bounds it is necessary to limit working-class dwellings to unfurnished dwellings consisting of from one to three, or, possibly, four rooms, generally let on weekly tenancy, at rentals of from 2s. or 2s. 6d. to 7s. 6d., or perhaps even to 10s. This will include tenement, cottage, and block dwellings.

Dwellings in "made down" or "tenement" houses, houses originally constructed for occupation by one family, but now let out in separate tenements to two or more families, have for years engaged the efforts of sanitarians in their improvement by adaptation, or their displacement by demolition.

The type of the true cottage dwelling is the cottage with or without upper floor, self-contained, and occupied by only one family, although it is difficult to apply this term too narrowly. These dwellings still exist in large numbers in the metropolis, but their construction and surroundings are the very antithesis of suburban cottage dwellings, and they may in most cases be added to the category of desirable demolitions.

Block dwellings, on the other hand, are understood to comprise sets of dwellings superimposed one above the other on the same base, possessing a common stair, and differing only from residential flats in length of tenancy, rental, and accommodation. Under the present inadequate restrictions as to construction, not a few recently constructed dwellings of this type are nearly as unsatisfactory as the dwellings they have displaced. But the majority are well-built, and it only requires the framing of bye-laws, and their due enforcement in the construction of this class of buildings, to ensure that in future all shall be constructed with due

regard to health. This is a subject which urgently needs the attention of the legislature.

In Mr. Charles Booth's recently published work on "Labour and Life of the People," Vol. II., London, the existing block dwellings of the metropolis have been classed in various categories, of which the following is a summary:—

Light, Air, and Sanitation.	Blocks.	Tenements.	Population.
"Very bad" and "bad" ...	115	6,859	37,911
"Fair," "good," and "very good" ...	360	28,921	151,197
Total ...	475	35,780	189,108

To provide for increase of population, cottage dwellings on new estates in the suburbs or the country, coupled with cheap and expeditious transit, are most desirable.

But in order to promote the health and comfort of town dwellings, the demolition of permanently insanitary and overcrowded dwellings, and of houses falling into dilapidation and decay is necessary, and it is then a question of utilising the site. If the site is to be devoted to other purposes, then provision for a number of persons equal to the population displaced may be made by the erection of cottage dwellings in the suburbs, for instance, in demolitions made for railway purposes. If, on the other hand, new and improved dwellings are to be erected upon the site, these may be either cottage or block dwellings.

The effect of clearing small areas appears to be firstly, to displace all grades of occupants alike, and to re-distribute them in the surrounding neighbourhoods; and, secondly, when the new and improved dwellings have been erected, to set up a reverse current by which the better grades are drawn into the new buildings, leaving the indifferent and inferior in occupation of the older buildings on the areas surrounding the site cleared; whether the new buildings be urban or suburban the same process of re-allocation takes place.

It cannot be doubted that the air and the surroundings of the suburb are more beneficial to the health, especially of growing children,

than those of the town; but the disadvantages of distance make themselves appreciably felt in the expenditure of time, energy, and money on travelling, the relaxation of family ties, and the curtailment of home life (the husband and other members of the family taking meals away from home), the frequent loss of work if the exigencies of occupation require the worker to be at short call, the long absence in occupations entailing exceptionally early or late hours, the increased expenditure in the family marketing, the extra cost, &c., if other members of the family besides the husband work away from home, and other disadvantages.

The success of suburban villages shows that these disadvantages may be overcome, and that the conditions may be made to fit the occupations of certain classes; but, on the other hand, the evidence of representative working men before the Select Committee of the House of Commons inquiring into artizans' and labourers' dwellings went to show that to many classes of workmen the disadvantages of distance were insuperable, and these classes must be housed upon the cleared sites, whether cleared by public undertaking or by private enterprise.

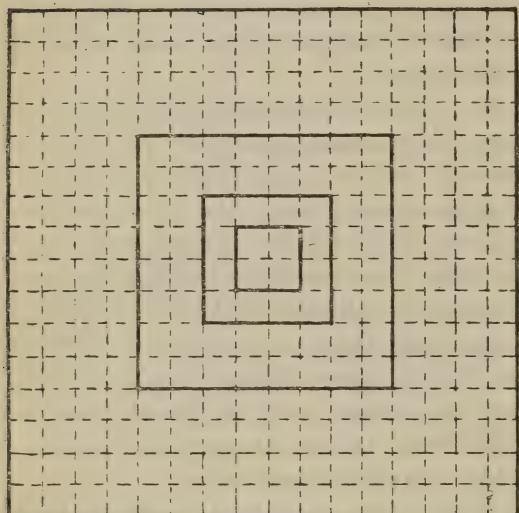
It then becomes a question whether small or large buildings should be erected upon the site. To erect cottage dwellings in the centre of cities would be costly, and would place the rental beyond the reach of the classes for whom they are intended. Besides, the overcrowded condition would be reproduced in housing the same number of persons on the same area, or a large proportion must remain unprovided for.

The object to be aimed at is to diminish the crowding by expanding the population through a greater amount of cubic space with increased light and air; and, whilst reconstructing, to provide improved sanitary arrangements, and to so dispose the dwellings as to enable them to be effectually supervised and protected.

The first consideration, therefore, is the amount of cubic space enclosable on square space.

The square space required for a cube to stand upon so that it may be surrounded by a square open area equal in width to half its height, (assuming that contiguous cubes would provide the other half, so as to complete a width of surrounding area equal to the whole height) would be twice the length of the base or side of the cube squared,  $-(2 S)^2$ : whilst the capacity of the cube would be the length of the side cubed,  $-(S)^3$ .

A



Length of Side (S).	Cubic Capacity $(S)^3$ .	Square Space required $(2 S)^2$ .
10 feet.	1,000 cubic feet.	400 square feet.
20 "	8,000	1,600
30 "	27,000	3,600
40 "	64,000	6,400
50 "	125,000	10,000
60 "	216,000	14,400
70 "	343,000	19,600

So that a cube containing 64,000 cubic feet would require only 16 times instead of 64 times the area of square space required by a cube containing 1,000 cubic feet—a simple and striking illustration of the gain of cubic space upon square space by increase in size under similar conditions. The effect upon the construction of buildings, although following parallel lines, is not such a simple deduction, but upon the same area and under the same conditions a much larger proportion of cubic space to square space may be enclosed by increasing the size of build-

ing, and the dwelling space may be further increased by the economy of staircase space and terrace construction in erecting rows of blocks.

In order to estimate the comparative amount of cubic space enclosable in actual building, it is desirable to briefly consider the height, depth, length, and spacing of blocks.

The height of rooms must be proportionate to size for the purpose of lighting and ventilation. Windows materially influence the height; it is undesirable to have windows that cannot conveniently be seen through or be easily manipulated. A window six feet high is ample, and if the bottom rail be not more than  $3\frac{1}{2}$  feet from the floor, and the top nearly reach the ceiling, as it should do, we have a height of over  $9\frac{1}{2}$  feet. Even half underground rooms are restricted to a height of over 7 feet, a very minimum. Sir Douglas Galton considers it desirable in small rooms to obtain a height of 10 feet to facilitate ventilation. Increase of height beyond what is necessary and desirable increases the number of stairs required to reach the next floor, and diminishes the number of stories, or renders it necessary to increase the elevation, in either case increasing the proportionate cost. So that about 10 feet may be assumed as a good standard for moderate-sized dwelling-rooms. Whatever the height adopted, it is not desirable that the rooms in the upper stories of a block should be of less height than those of the lower.

The number of stories is obviously governed by the height of the rooms and the total height of the building.

The total height of blocks is limited by many considerations. It is highly desirable, almost necessary, that a street should run between every alternate row of blocks. Although in the metropolis in old streets, houses can be and are being constantly raised to heights out of all proportion to the intervening space, no new street can be formed of less width than 40 feet, and no new building which shall exceed in height the width of the street can be erected

on the side of a street less than 50 feet wide. Last year only, a clause was introduced into a General Powers Act of the County Council limiting the total height of buildings to 90 feet. So that, provided it does not exceed 90 feet the height of buildings is under no legislative control, except in new streets between 40 and 50 feet wide. With increased height, difficulty of access to the topmost stories increases, and the rentals tend to diminish. There is additional cost for increased strength of construction, and the gain in cubic space in proportion to square space tends to diminish. Beyond a certain height lifts would be required, the construction and working of which would add to the cost, and endanger the lives of the large infant population prevalent in these buildings. There is a height beyond which it is on all counts false economy to build. So that blocks would be limited to a height of from 40 to 60 feet, or to four or six stories of ten feet; practically the latter is about the present maximum limit.

The depth of a room according to Trélat should not exceed one-and-a-half times the height from the floor to the top of the window. This would give an incidence of  $30^{\circ}$  to the rays of light reaching that portion of the floor furthest from the window if an angle of  $45^{\circ}$  were required the depth would equal the height. According to the latter, a room 10 feet high would be 10 feet, and to the former 15 feet, deep as a maximum. The depth of ordinary double fronted terrace houses may be roughly taken as varying from 25 to 35 feet, and by doubling the maximum assumed depth of a single room, as above, a depth of 30 feet is reached.

There is no advantage in constructing rooms for the working class families of a width or length in the line of frontage requiring more than one window to adequately light them, and it is highly desirable that they should not exceed a length that can be adequately lighted at the sides. The incidence of light entering horizontally impinges on the lateral walls at an

angle of 45 deg., the dark angles on each side of the window diminishing or increasing as the side walls approach or recede, and the width of the room must be governed more by the width and situation of the window than by the height or depth of the room.

Block dwellings encourage increased length as well as depth of rooms on account of the greater economy of ground space obtained in many-storied as contrasted with single-storied buildings. Firstly, because the initial ground space occupied by the increased area of the building serves a number of stories, whereas in single-storied buildings increased area of the building requires a correspondingly increased amount of ground to be covered for each separate building. Secondly, because the greater the area of building served by a single staircase, the greater the economy of staircase space. So that the length of a single block is limited by the number of consecutive rooms accessible from the same staircase.

The healthiest condition of construction is that in which through ventilation, or perflation, may be obtained. Blocks may be so constructed as more or less to reproduce one of the bad features of back to back houses. Corridors and lateral passages are undesirable, and it is also undesirable that bedrooms should become passage ways to rooms beyond; these considerations limit the number of consecutive dwelling rooms on either side of the staircase.

The length of a row of blocks is limited by the length of the ground area, but it is also desirable that the blocks should not be more numerous than the superintendent can efficiently supervise and protect.

It is unnecessary to enter here into the disadvantages and unhealthiness of single-fronted dwellings, especially when erected in terraces, from the absence of rear space and of through ventilation or interior perflation. This is exhibited in its worst form in back to back houses, when two rows of single-fronted dwellings are erected with their fronts facing in opposite

directions, the same back party-wall serving both rows, and a public street running along each front. Given the principle that the fronts of all buildings should face open spaces proportionate to the height of the buildings and along their whole length, and that the rear space should not only remain open, but should not be converted into a public thoroughfare (a most important point), there is no economy of ground space in constructing single-fronted buildings, whether they are back-to-back or not.

Out-buildings, towers, or projections abutting at right-angles to the line of frontage are objectionable by impeding light and air on either side, in proportion to the distance they advance from the main front, and according to orientation. On the other hand, there is great advantage in being able to obtain cross-ventilation and cross-light between the main building and the projection when this contains the sanitary arrangements. Where such projections are constructed an additional amount of open space should be required in proportion to the projection, and the projection should not be allowed to advance so as to obstruct exterior perflation, and on no account so far as to close up the stretch of open space, whether in front or at the rear, forming a cul-de-sac in either case, the one of the courtyard, and the other of the street, nor should terraces be permitted to abut directly upon one another at right angles. Orientation also will necessarily affect the lighting, the least obstruction to the sun's rays being presented by buildings running north and south.

Terraces of blocks being double-fronted, both rear and front should face open spaces proportionate in width to the height of the buildings. The question whether this proportion should be equal to the height, according to Dr. Clement; or to one-and-a-half times the height, according to Dr. Trélat; or should vary with latitude and orientation, according to Adolphe Voght; or with city zones according to Von Gruber; was discussed at the Vienna Congress, and remains

undecided. But that the width of open space on both frontages should be proportionate to the height of the dwellings is accepted, and anything less than a width equal to the height of the building above ground level would be unacceptable to hygienists.

The reckless manner in which at the present moment blocks of dwellings are being erected, with an utter disregard for this provision of light and air, calls most urgently for legislative restrictions in the construction of this class of buildings.

Present metropolitan legislation, so far as front space is concerned, only affects buildings in new streets, and new streets are few and far between in London; furthermore, it does not affect streets over fifty feet wide. So far as rear space is concerned, it only provides for a space ten feet wide extending the length of rear fronts of buildings from fifteen to thirty feet wide, 450 square feet being held to suffice for any length over thirty feet, but even this inadequate provision is inoperative when the site has previously been occupied in whole or in part by buildings; and, furthermore, when it does become operative it permits the whole of the open space to be built over up to the level of the first floor.

The growing antipathy of philanthropists to block dwellings is greatly justified by the dread of the ultimate effects of the total absence of any restrictions as to this class of buildings erected on old sites. The crusade against insanitary dwellings, without adequate restrictions upon the buildings that will replace them may make the last state worse than the first. The attitude of antipathy must become one of sympathy, and the efforts of sanitarians and philanthropists should rather be directed to righting the wrong as soon as possible.

Having briefly considered the conditions of construction, we may now proceed to calculate the relative amount of cubic space enclosable on a rectangular area under varying conditions of height of building. Such a calculation would

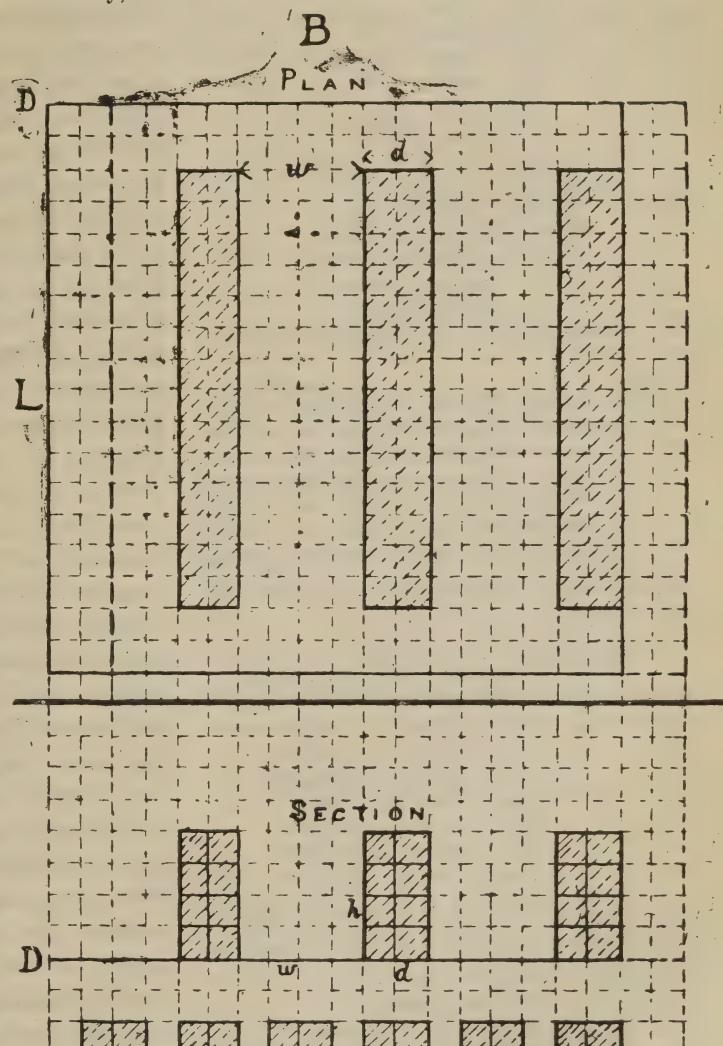
only apply to a small area, at the most limited to a few acres, for in a larger area other factors would be introduced which are beyond present consideration.

When superimposing dwellings one above the other, for every additional floor or story, the floor area of the story is economised, and it is only necessary to provide space equal to the areas of the two fronts. One interspace will serve the opposed fronts of two blocks, that is, each block will have on either side of it one-half the amount of open space due to it, and the width of open space to be calculated with each block will be proportionate to the height and number of the stories; the same applies to the ends of the rows of blocks. Therefore, the depth of the block, *plus* the width of the open space on one side, will equal the depth of total space occupied by one block, and this divided into the total depth of the area will give the number of blocks. Assuming that the length of the blocks is equal to the length of the area, less the space required at each end, and that each story or stage is of the same height, then the cubic capacity of one block multiplied by the number of blocks will give the total cubic space enclosable.

Let it be assumed that the total area is 500 feet by 250 (about 2.87 acres), the former being the depth, the latter the length coinciding with the long axis of the buildings; that the depth of each block is thirty feet, allowing two rooms each of fifteen feet deep; that the height of

each floor is ten feet; and that the width of intermediate space is equal to the height of the blocks.

(1) The first step is to find the number of rows of blocks.



Let  $D$  = total depth of area;

$d$  = depth of one block;

$h$  = height of one story;

$n$  = number of stories;

$w$  = width of one interspace;

then  $w = h$  and  $\frac{D}{d + nh}$  = number of blocks.

If 1 story high	$\frac{D}{d+h} = \frac{500}{30+10} = 12.500$	rows of blocks.
„ 2 stories „	$\frac{D}{d+2h} = \frac{500}{33+20} = 10.000$	„
„ 3 „ „	$\frac{D}{d+3h} = \frac{500}{30+30} = 8.333$	„
„ 4 „ „	$\frac{D}{d+4h} = \frac{530}{30+40} = 7.142$	„
„ 5 „ „	$\frac{D}{d+5h} = \frac{500}{30+50} = 6.250$	„
„ 6 „ „	$\frac{D}{d+6h} = \frac{500}{30+60} = 5.555$	„
„ 7 „ „	$\frac{D}{d+7h} = \frac{500}{30+70} = 5.000$	„

(2) The second step is to find the cubic capacity of one row of blocks.

Let  $d$  = depth of one block;

$h$  = height of one story;

$n$  = number of stories;

$l$  = length of area;

then  $d \times nh \times (l-nh)$  = cubic capacity of one row of blocks.

If 1 story	Cubic feet
high $d \times h \times (L-h) = 30 \times 10 \times (250-10) = 72,000$	
„ 2 „ $d \times 2h \times (L-2h) = 30 \times 20 \times (250-20) = 138,000$	
„ 3 „ $d \times 3h \times (L-3h) = 30 \times 30 \times (250-30) = 198,000$	
„ 4 „ $d \times 4h \times (L-4h) = 30 \times 40 \times (250-40) = 252,000$	
„ 5 „ $d \times 5h \times (L-5h) = 30 \times 50 \times (250-50) = 300,000$	
„ 6 „ $d \times 6h \times (L-6h) = 30 \times 60 \times (250-60) = 342,000$	
„ 7 „ $d \times 7h \times (L-7h) = 30 \times 70 \times (250-70) = 378,000$	

(3). The third step is to find the total cubic space enclosable.

Let  $N$  = number of rows of blocks;

$C$  = cubic capacity of one row of blocks;

then  $N \times C$  = total cubic space enclosable on the area.

If 1 story high	$12.500 \times 72,000 = 900,000$	cubic ft.
„ 2 „ „	$10.000 \times 138,000 = 1,380,000$	„
„ 3 „ „	$8.333 \times 198,000 = 1,650,000$	„
„ 4 „ „	$7.142 \times 252,000 = 1,800,000$	„
„ 5 „ „	$6.250 \times 300,000 = 1,875,000$	„
„ 6 „ „	$5.555 \times 342,000 = 1,900,000$	„
„ 7 „ „	$5.000 \times 378,000 = 1,890,000$	„

On an area 500 feet by 250 feet, equal to 2.8787 acres, the amount of cubic space enclosable per acre would be—

1 story high 312,641 cubic feet.

2 „ „ „	479,383	„	53.3	Increase per cent.
3 „ „ „	573,175	„	19.5	
4 „ „ „	625,282	„	9.1	
5 „ „ „	651,335	„	4.1	
6 „ „ „	660,020	„	1.3	
7 „ „ „	656,546	„		

On the above area buildings four stories high would enclose double the amount of cubic space of buildings one story high under the same conditions.

(To be continued.)

## IS THE SALVATION ARMY A PUBLIC NUISANCE?

NOTWITHSTANDING the fact that some persons in authority have, taking a theoretical view of the subject, declared that the Salvation Army has a right to march where and whither it pleases—in other words, to hinder the traffic of our streets and to disturb the quiet of any locality—I venture to propound this question after considerable personal experience. Shortly before the August Bank Holiday, three years ago, the army commenced a “fourteen days’ campaign” in our unfortunate parish, which fortnight was extended into more than a month. According to the notions of their leaders an army is nothing unless it is aggressive, and one of the first steps was to erect a huge tent open to view on a small piece of ground situated in the principal street, within a few yards of the thoroughfare, and close to a number of private houses. Here, once or more often on each week-day, and four times on Sundays, several hundred persons congregated in the marquee, and conducted their services, consisting mainly of loud harangues and ejaculations, tambourine playing, hand clapping, and singing various ditties, interlarded with sacred allusions, to the commonest music-hall airs. The surrounding spaces, including the footpaths and roadway, were blocked with idle loungers, many of them of the “Larrikin” type. Whatever might have been the intended effect upon those inside the tent, on the outside audience the immediate result of the strange medley of buffoonery and blasphemy was to briskly stimulate them to enlarge considerably on both themes. The monotony of the long series of gatherings was diversified by the introduction of special elements of presumed interest. At one meeting, for instance, a certain “Herr Mordecai Rotholtz, a converted Jew, lately escaped from Egypt,” was the leading feature, and created much amusement by his extraordinary antics when the army made the customary parades through the town previous

to the services. I have been unable to ascertain why H. M. R. should have had any difficulty in getting away from Egypt, unless he irritated the mild, long-suffering "fellahs" to such an extent that flight was the only chance open to H. M. R. of leaving with a whole skin; but perhaps some one engaged in drawing up the programme got rather mixed as to early Biblical history. On another occasion some converted infidels made the more susceptible amongst their auditors decidedly uncomfortable by somewhat boastful stories of their past life. Like Joe in "Pickwick," they wanted to make their hearers' flesh creep, and they did it, too. This vainglorious recapitulation of so much wrongdoing, reminds me of an anecdote told of a Salvationist convert who was loudly bragging at a provincial meeting of the number of robberies he had had a hand in before joining the army. "Why," exclaimed he, "I put up half a dozen burglaries in as many months in this very county." "You couldn't oblige me with the address of one of them, could you?" quietly remarked a plain-clothes constable who was standing near, and hoped thus to acquire a little useful knowledge. But the dove had not wholly put aside the cunning of the serpent, and the astute member of the force had to go without the "information received" which figures so often in police-court reports. So far I have spoken chiefly of week-days; but it was especially on Sunday, a day on which all people look for some rest and quiet, that the annoyance to householders in the neighbourhood was greatest. Soon after six in the morning the first meeting was held, another at eleven, a third at three p.m. and a fourth at seven, each lasting about two hours, so that what with eight hours' devotional work in the tent (if devotional it may be styled to play a tambourine, to sing a semi-comic song, or to clap one's hands as vigorously as a 'bus driver on a frosty morning) and the long preliminary marches of the army through the principal streets, enlivened with flash tunes, vocal and instrumental, it is

not difficult to estimate the amount of Sabbath rest enjoyed by residents in the vicinity of the encampment. I may observe here, parenthetically, that the hubbub was so great that during the whole of Sundays, and at certain hours of weekdays, we could not bear a single window open on the side of the house nearest to the camp—no small discomfort on a sultry August day. I know that my neighbours all suffered greatly from the almost constant annoyance. Perhaps I have more reason to answer the question at the head of this article in the affirmative than even they have, for, being actively engaged in professional work in London during the daytime, I had only the evenings left for various literary pursuits. My labours in this respect were much interfered with, and I was compelled to decline a special literary commission which had to be executed within a certain time. Besides all these grounds of complaint the health of at least one member of my family was affected by the incessant tumult. Really it seems to me that a new Act of Parliament, with clauses particularly directed against the Salvation Army, entitling householders and others to "compensation for disturbance," ought to be passed next session.

W. A.

## Notes and News.

**A COMPLIMENT TO BRITISH ARCHITECTS.**—Speaking at one of the meetings of the Architectural Section of the Congress of Hygiene, Professor Feneger, of Copenhagen, stated that the architects on the Continent had not, until recently, looked so much to England for instruction, as they ought to have done; but the conviction has now dawned upon them that in one respect England has taken a prominent part among the nations of Europe since the beginning of this century—viz., in sanitary house-building, also in the construction of separate wards in hospitals." "Now," added he, "we cannot build even a stable on the Continent without being indebted for ideas to England."

**EGGS FROM RUSSIA.**—During the past eight months England imported from Russia no less than 957,182 great hundreds of eggs (equal to nearly 115 millions, each great hundred including 120 eggs), and their money value was set down at £248,822, or nearly a quarter of a million sterling. A few years ago this

branch of the trade was unknown. The freshness of eggs brought from such a distance is an open question; but they are as surely taking the place of French eggs in cheap localities, as the latter have substituted English eggs, thanks to the supineness of English farmers. The wholesale price of French eggs nearly 8s. per 120; of Russian eggs, somewhat under 5s.

**HOME STUDIES FOR SCHOOL CHILDREN.**—In the Education Section of the Congress of Hygiene, the question of the desirability of the abolition of all out of school work was raised, and after some discussion, in which Professor Gladstone supported the general principles of the resolution, Mr. Noble Smith and others going still further, a motion that out of school work should be abolished or restricted, was carried by two-thirds of the members of Congress present. From a hygienic point of view, we cordially endorse this resolution.

**TOBACCO.**—During the last half century the consumption of tobacco per head of the population has nearly doubled, and the increase becomes progressively larger every year. Last year, the quantity on which duty was paid exceeded that of the previous twelve months by 3,188,336 pounds, being more than double the increase recorded in any previous similar period.

**MILK ADULTERATION.**—A singular instance of the impunity with which the adulteration of milk is practised in London came to the knowledge of the writer of this paragraph some time ago. A strange lad, carrying two milk pails, entered the shop of a respectable eating-house keeper, in Southwark, and asked for a penny-worth of pudding and a mug of water. Upon being supplied, he proceeded to eat the pudding, and, after putting down his penny, poured about half a pint of the water into one of the milkpails, saying, "That will pay for the pudding." On being remonstrated with by the woman who served him, the boy coolly replied that that was the way in which he always got pudding, and that he didn't "go short, either," and then resumed his "milky way," to vend the contents of his cans as "Milk from the Farm," at fourpence a quart. If all milk-boys were as fond of pudding as the one in question, and equally unscrupulous in their method of procuring it, the customers resident at the end of their rounds would have what our Transatlantic cousins would call a "watery time."

**THE EDINBURGH SCHOOL OF COOKERY AND DOMESTIC ECONOMY** now gives a "Housewife's Diploma" to all candidates who successfully pass examinations in practical housekeeping and management, cookery, laundrywork, needlework, dressmaking, book-keeping, first aid to the injured, and home nursing. Students may reside at a boarding-house started for that purpose, or they may attend classes from their own homes. The period requisite for training is twenty weeks. Many householders would hail with satisfaction the establishment of similar institutions in London and other large English towns.

**LIFE IN OUR VILLAGES.**—A series of special articles under this title are making their appearance in the *Daily News*. The writer, who evidently possesses a thorough knowledge of his subject, delineates with graphic power the social and sanitary condition of our country villages. The question of the insanitary state of the dwellings occupied by the working classes in our rural districts has been frequently discussed in the columns of **HYGIENE**, and we are glad to find it grappled with by so vigorous a writer in a journal of such wide and influential circulation.

**AN ITALIAN HYGIENIST'S OPINION OF ENGLAND.**—Professor Angelo Celli, who was one of the delegates from Italy at the recent International Congress of Hygiene has published an account of his visit and the impressions which he formed. He was particularly struck with the sanitary arrangements of many of our large towns, and he sums up his very favourable criticisms in the observation: "The hygiene of the citizen and the public charities of England are quite two centuries ahead of ours."

**A DEFINITION OF MODERATE DRINKING** that will satisfy all parties has yet to be written. Meantime, the following remarks with which a Scotch minister is said to have concluded a harangue on drunkenness are peculiar enough for reproduction:—"I've nae objection to a dram in the morning when ye get up, and another after breakfast to help ye begin the day, and one before dinner to gie ye an appetite, and another afterwards to help digestion, and ye may take a dram or two in the afternoon, and one for a nightcap; but dinna be a dram, dramming!"

**THE CENSUS IN FRANCE** has caused some uneasiness to the authorities, owing to the small increase of the population shown thereby. Although the total population is rather over thirty-eight millions of people, the increase in the five years which have elapsed since the last returns were obtained in 1886 is very little over 200,000. At the beginning of the present century the population of France was 27 millions, as against 16 millions in Great Britain. Now, notwithstanding the falling off in the population of Ireland, the United Kingdom has a population nearly as large as that of France, requiring only between three and four hundred thousand to bring it up to the French figures; viz.—38,095,150.

**THE MORTALITY RATES OF THE PRINCIPAL EUROPEAN CITIES** are as follow, per 1,000 of the population:—Stockholm, 19·6; Christiania, 21·1; Brussels, 21·5; Copenhagen and Berlin, each, 21·6; Rome, 23·4; Paris, 24·5; Vienna, 24·6; St. Petersburg, 28·4; Venice, 29·3; Munich, 30·0; Buda-Pest (where the next International Congress of Hygiene will be held, in 1894), 31·4; Moscow, 40·3. In the American cities the annual death-rate last year ranged from 18·7 in St. Louis to 28·5 in New Orleans. At Cairo it was 44·8; and at Alexandria 39·6 per 1,000. In India the rate at Bombay was 26·6; at Calcutta, 28·5; and at Madras, 42·9.

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## SPECIAL NOTICES.

**EDITORIAL.**—The editor begs to thank all of those gentlemen who have kindly forwarded copies of papers read by them at the recent International Congress of Hygiene. Several of these appear in the present number of HYGIENE, and others will be published in subsequent issues. The editor will be pleased at any time to receive communications, books for review, etc., bearing upon the numerous important subjects dealt with in these columns. He takes this opportunity to request his many correspondents to note the change of address referred to below.

**PUBLISHING NOTICE.**—Beaumont and Co., publishers, beg to notify that, in consequence of the necessity of acquiring larger premises, they have taken the house, 39, Southampton Street, Strand, W.C., where their business will in future be conducted and HYGIENE published. With the increased facilities at their command, Beaumont and Co. will be now prepared to undertake any printing or publishing which may be entrusted to them.

## MEAT INFECTIONS—FOOD POISONING.\*

By EDWARD BALLARD, M.D., F.R.C.P., F.R.S.,  
Medical Inspector, Local Government Board.

I HAVE undertaken, at the request of the Council of this Section, to open the discussion

of the third question which it has been arranged that the Section should consider, viz., "Infection of Meat, Milk, and other Comestibles." It is a subject which has come largely into prominence of late years, during which the mode of morbid infection of food and the manner in which such infection comes to operate on the human body have been made matter of diligent research. Carrying back my memory to an antecedent period, little was known beside this, that occasionally symptoms of poisoning followed the use of apparently wholesome kinds of food, but the phenomena of food poisoning were not in any case that I recollect identified with those of any known specific disease, with the exception perhaps of choleraic diarrhoea or cholera nostras.

Milk especially, prior to about twenty years ago, was regarded as invariably a particularly wholesome and harmless kind of food, and gastro-intestinal disturbances, obviously resulting from the eating of flesh-foods, or of soups, etc., prepared from them, were commonly attributed to accidental impregnation of the food with such metallic poisons as copper or antimony, or, in rare instances, to some chemical change in its organic constituents, the nature of which, if it differed at all from ordinary putrefaction, was unexplained, and at that time inexplicable. Indeed, much of the etiological research of the last twenty years has had reference to the production of disease in man through the

\* A paper read before the International Congress of Hygiene.

agency of his food. Investigations into the spread of certain specific fevers, such as enteric fever and scarlet fever, through milk, took the lead at all events in this country, investigations which have always appeared to me to have been the natural outcome of the epoch-making labours of Dr. John Snow on the relation of epidemic cholera to infected water, and the subsequent demonstration by others of a similar origin in the case of outbreaks of enteric fever.

Of necessity all that could be at first established as to the spread of specific disease by milk, by the comparatively rough method of clinical enquiry, was the bare fact of the milk being accidentally infected and capable, when so infected, of conveying the specific contagion into the human system. But since the rise and cultivation of the science of bacteriology, new and more delicate methods of research have become available. We have now been taught by the experts in this branch of physiological and pathological microscopy, and by the complementary work of organic chemists, a great deal that we wanted to know about the nature of that which we were in the habit of calling *matrices morbi*, and where this has been determined a good deal further about the connection that sometimes exists between an animal furnishing food, and the disease that food may produce in man. And this new method of research has further become available for the elucidation of the phenomena of what has been called "food poisoning." I propose in this communication to the Congress to limit my remarks to this latter branch of the subject which is to occupy the attention of the section to-day, and to lay before the section the results of a short series of experiences which, during the last ten or twelve years, have fallen to the lot of the medical department of the Local Government Board of this country, experiences which very largely derive such value as they possess from the devoted labours of Dr. Klein, who has always been obligingly ready to favour the Board and the department with his invaluable assistance.

Fourteen instances of such poisonings out of a larger number that have from time to time come under the notice of the Medical Department of the Local Government Board are available for my present purpose, and will serve to illustrate the points to which I desire to draw the attention of the Section. Some of them have been fully reported in the published reports of the medical officers; others have been published elsewhere.

My conclusions are as follows:—

1. I may quote the words of Dr. Buchanan, the Medical Officer of the Board. He says (19th Report, p. xiii.):—

"The phenomena which we speak of as 'food-poisoning,' productive now of one and now of another sort of definite malady among consumers of certain foods, are claiming, on ever-growing evidence, to be regarded as true infective diseases, as much so as scarlatina or tuberculosis. That they have not been generally admitted into this rank arises, first, from the circumstance that some of them have seemed to be wanting in an incubating period; and, secondly, because they are rarely recognised as transmissible from person to person. But from our researches of this very year (1888) we derive some new considerations that materially affect the importance of incubation, as determining the infecting nature of a poison; while we need go no farther than the experiences of Middlesbrough in 1888 to find suggestion of disease-bacteria operating alternately through the atmosphere and through infection of food material by them."

2. In infected food capable of producing disease on being eaten we find one or both of two things—a living microscopic organism and an organic chemical poison of greater or less virulence

3. Of these two things, that which is immediately operative in the production of the morbid phenomena is the chemical poison which is apparently of a basic nature and a product of the processes of bacterial life.

4. Specifically different bacteria capable of producing this chemical poison may through its agency give rise in the human system and in animals to clinical phenomena and pathological changes in the organs which are so similar that at present they cannot be distinguished.

5. Give the bacterium and favourable environment, the bacterium may grow, multiply, and produce its own special chemical poison from the material which affords it nourishment either outside the body or within it. One important element of environment is temperature. If a bacterium will not grow at the temperature of the body, it of course will not produce its operative chemical poison when introduced into the system.

6. Moreover, both the bacterium that produces the chemical poison in an infected food and the chemical poison itself may apparently be evanescent; perhaps in the former case the bacterium being killed by its own products, and perhaps in the latter case, because the chemical poison undergoes destructive changes. Hence an infected food poisonous when eaten at one time may fail to be poisonous when eaten at a later period, or poisonous when inoculated at one time may cease to be so later on; or one portion of an infected mass of food may be poisonous, and another part not be so.

7. It is to be observed that in many cases of food poisoning an incubation period has been distinctly traced, in others it has been less obvious; in some there was practically none, only from half an hour to a few hours elapsing between taking the food and the initial symptoms of the malady. This presence and absence of incubation may be taken as clinical evidence of the symptoms being due to the operation within the body of the bacterium itself, or of their being due (at first, at all events) to the operation of the chemical poison already prepared in the food. Where merely the bacterium is introduced, time is required as in other specific infections for the growth and multiplication of the micro-organism in the

body, with the formation there of its poisonous chemical product. When the chemical poison already prepared outside the body is introduced, it operates more speedily, the rapidity of the operation being proportional to its quantity and quality, and the individual peculiarities of the recipient. In the several series under consideration the instances of long incubation (where it has been possible to ascertain the fact) occurred in cases where there was no doubt of bacteria having been introduced into the system, as in the Welbeck and Nottingham ham and pork cases, and the Retford pork pie case. I had reason to think that in the case of the Middlesbrough bacon the incubation period was eighteen to thirty-six hours, or perhaps a little longer. On the other hand, it was certain that no bacterium was introduced in the food or one which would not grow at the temperature of the body, as in the Chester sausage case, the Wolverhampton tinned salmon case, and the Iron Bridge veal pie case, or was non-pathogenic on inoculation as in the Portsmouth instance, the illness commenced at periods varying from half an hour to ten, twelve, fourteen, or seventeen hours only eating. But in some of these food-poisoning series of cases there were individuals who suffered quickly and others who suffered after a long interval. It was so in the Welbeck series of cases, where the interval varied from less than twelve hours to more than forty-eight hours; in the Nottingham pork case, where it varied from about twelve hours to thirty-four hours; in the Whitchurch pork case, from seven to over nineteen hours; in the Carlisle case from six to forty-three hours, and in the Retford case from under four to about thirty-six hours after eating. The interpretation of these varieties appears to be that, in the food eaten, the bacterium capable of developing in the body and the chemical poison already formed in the food were not equally distributed through the mass of the material, one individual case getting more of the one and another more of the other in the por-

tion given him. Where, as in the Whitchurch pork case, persons who fed upon the food latest had the shortest interval and the most severe attack, the interpretation may be that the individuals who fed at an earlier period got the bacillus in an active stage, when little of the chemical poison had been produced in the food, and those who fed later on got a larger dose of the chemical poison for the more abundant productions of which by the bacterium time had been afforded by the postponement of the eating.

8. As regards the kinds of animal food which in the adduced instances produced mischievous or fatal results. Of the fourteen instances food was or consisted largely of—

Pig meat of one kind or another	9 instances.
Veal	1 instance.
Beef	1 instance.
Butcher's meat (kind unstated)	2 instances.
Tinned salmon	1 instance.

I am disposed to think that this is no unfair representation of the relative frequency with which swine's flesh thus gives rise to specific diseases of the kinds referred to, as compared with animal food from other sources. Certainly, apart from these instances, this corresponds with my general experience, and I expect the experience of the profession at large. What explanation can be offered of this? There is no reason whatever to believe (quite the contrary) that the food in any of the instances above recorded contained the specific micro-organism before it was prepared for food. The American pork that, converted into mild bacon at Middlesbrough, was a means of conveying to persons eating it a specific pneumonic fever was obtained from American firms at Chicago and elsewhere of the highest repute, and consignments of the same brand at about the same time to other similar bacon makers at Stockton, only a mile or two distant, did not spread any epidemic, so far as I could learn, among its consumers; nor did other hams or bacon than those which produced disease at Welbeck, although made from the same consignment of American pork, produce

similar disease to the Welbeck epidemic. And it is to be noticed that in the Nottingham pork case and the Bishops Stortford beef case other portions of the carcases were eaten harmlessly. And this is an observation I have made in other instances of food poisoning within my experience.

The truth of the matter seems to be that the accession of the specific bacillus to the food is what we commonly call "accidental," which of course only means in this case that it comes from somewhere beyond our present knowledge. We do not know its normal habitat, but assuredly it now and then becomes air-borne, infects food of a kind that affords it appropriate nutriment, multiplies and produces its appropriate chemical poison there, and produces its appropriate specific disease in persons who consume the infected food. I have elsewhere suggested a similar hypothetical explanation of epidemic summer diarrhoea, another unquestionable specific disease. But if we do not know where the normal home of the bacillus is, nor how it escapes to do mischief, we do know something about the circumstances under which it gains access to food, which may help to elucidate even this point. It is to be noted that in every instance except one (No. 2), the Nottingham pork case, it was food that had been prepared a day or longer previously to its consumption, stored in one way or another, and then eaten cold, which produced disease. And it is the conditions under which the preparation of the food took place, and under which it was subsequently stored, that, in certain of the instances narrated, served to furnish a clue to the knowledge we want. The observations I made indicate an infectiveness of the place where these things were done, in association with uncleanliness of air, of soil, or of surface. I must be content to refer to my reports on the Welbeck and Nottingham cases, and to my summary of the Carlisle case, as evidence of this, and notably to my report on the Middles-

brough outbreak, where the circumstances of the processes of bacon-making at Middlesbrough and Stockton are contrasted. Still, all this does not explain the special liability of pig-meat to produce these specific maladies. How is this to be accounted for? I have been disposed to gather a suspicion of what the explanation is from what I have said above about the Nottingham pork case, viz., that it was perhaps the gelatinous gravy and not the flesh of the pork that was really the peccant material. I could not hear of anyone having been made ill by eating the pork served to them after it had become cold, which, of course, would have been without gravy. And the explanation I have to suggest is this, that of all adult flesh meats ordinarily eaten, pork under the process of cooking furnishes the largest proportion of gelatine. Young meats, such as veal (used in the Iron Bridge case), are also largely productive of gelatine, and gelatine is a favourite nutriment of morbific bacilli. We may note how many of the articles of food most generally partaken of at the Carlisle wedding breakfast were gelatinous or gelatinised. These were the cold American ham, which moreover was glazed on the surface with gelatine, the game pie, the cold boiled salmon, and among the sweets the jellies and the trifles. Of two or more of these everyone that was taken ill had partaken. The Portsmouth case illustrates the same point, since a boy who ate nothing but gelatinous gravy (with pie-crust that was beyond suspicion) was made as ill as others who had eaten the meat of the pie.

9. And yet another word, before I conclude, on the practical application of all this. What does it all indicate as an efficient precaution against food poisoning? Of course no one is likely to be hindered by any fear of infection from eating cold ham or gelatinised food of any kind if he likes them. But if we do eat ham or bacon, cold or warm, it is a proper precaution to avoid them if not duly cooked

throughout. The people who chiefly got pneumonia in Middlesbrough were a class who habitually only warmed the bacon they ate by slightly toasting it before a fire; they did not heat it sufficiently to kill any micro-organism; and hotel hams (indeed hams cooked at home too) are rarely thoroughly cooked. But the grand precaution of all is the very commonplace one signified by the word cleanliness. Every factory where pork is converted into brawn or hams ought to be so arranged that light and a draught of air can penetrate freely everywhere; there should be no corners where refuse matter can lodge and become a centre for the cultivation of morbid micro-organisms in filth; the rise of ground air should be obviated by cement under the pavement or flooring; and the place should be kept scrupulously clean and free from incursions of sewer air or putrid emanations of any kind. Kitchens, and, above all, pantries and places where food is stored, in hotels, public refreshment rooms, or pastrycooks' premises, and in private houses, should be similarly cared for. It should be held to be part of the business of conservators of public health to see that these rules are observed, as well as the business of every master or mistress of a family.

#### ON DEMOGRAPHY.\*

By MR. FRANCIS GALTON, F.R.S., President of the Section on Demography.

In the address, which it is my honourable duty to deliver at the opening of this Congress, it would be presumptuous to obtrude opinions on any one of the larger parts of the subjects that will engage its attention. I am addressing experts who have practically dealt with the numbers and occupations, with the marriages, births, and deaths of millions of their countrymen; who have investigated on the largest

\* The Presidential Address delivered at the International Congress of Hygiene and Demography.

scale the effects of past legislation, and collected new data in which accurate information was from time to time of pressing national importance. I have not had the experience necessary to justify my addressing you on these matters in their more familiar aspects. Instead of doing so, I will call your attention for a few minutes to certain topics of demographic inquiry which enter into the great problem of the future betterment of the human race.

They are confessedly, at the present time, hardly advanced beyond the stage of academic interest, but thought and action move swiftly nowadays, and it is by no means impossible that a generation which has witnessed the exclusion of the Chinese race from the customary privileges of settlers in two continents, and the deportation of a Hebrew population in a third, may live to see other acts of any analogous kind performed under sudden socialistic pressure. The questions about to be considered may unexpectedly acquire importance as falling within the sphere of practical politics, and if so, many demographic data that require forethought and time to collect, and a dispassionate and leisurely judgment to discuss, will be hurriedly and sorely needed.

The topics to which I will allude are the relative fertility of different classes and races, and their tendency to supplant one another under various circumstances.

The whole question of fertility under the various conditions of civilised life requires more detailed research than it has yet received. We require further investigations into the truth of the hypothesis of Malthus, that there is really no limit to over-population beside that which is afforded by misery or prudential restraint. It is true that misery, in any justifiable sense of that word, provides the only check which acts automatically, or are other causes in existence, active, though as yet obscure, that assist in restraining the overgrowth of population. It is certain that the productiveness of different marriages differs greatly in consequence of un-

explained conditions. The variation in fertility of different kinds of animals that have been captured when wild and kept in menageries is, as Darwin long since pointed out, most notable and apparently capricious. Most of those which thrive in confinement, and enjoy apparently excellent health, are nevertheless absolutely infertile; others, often of closely allied species, may have their productivity increased. One of the many evidences of our great ignorance of the laws that govern fertility is seen in the behaviour of bees, who have somehow discovered that, by merely modifying the diet and the size of the nursery of any female grub, they can at will cause it to develop either into a naturally sterile worker, or into the potential mother of a huge hive.

Demographers have, undoubtedly, collected and collated a vast amount of information bearing on the fertility of different nations, but they have mainly attacked the problem in the gross and not in detail, so that we possess little more than mean values that are applicable to general populations, and are very valuable in their way, but we remain ignorant of much else, that a moderate amount of judiciously directed research might, perhaps, be able to tell.

As an example of what could be sought with advantage, let us suppose that we take a number sufficient for statistical purposes, of persons occupying different strata or classes, those who are the least efficient in physical, intellectual, and moral grounds, forming our lowest class, and those who are the most efficient forming our highest class. The question to be solved relates to the hereditary permanence of the several classes. What proportion of each class is descended from parents who belong to the same class, and what proportion is descended from parents who belong to each of the other classes? Do those persons who have honourably succeeded in life and who are presumably, on the whole, the most valuable portion of our human stock, contribute on the aggregate their fair share of posterity to the next generation? If not, do

they contribute more or less than their fair share, and in what degree? In other words, is the evolution of man in each particular country favourably or injuriously affected by its special form of civilisation?

Whatever other countries may or may not have lost, ours has certainly gained on more than one occasion by the infusion of the breed of selected sub-races; especially of that of the Protestant refugees from religious persecution on the Continent.

It seems reasonable to look upon the Huguenots as men who, on the whole, had inborn qualities of a distinctive kind from the majority of their countrymen, and who may, therefore, be spoken of as a sub-type, that is to say, capable, when isolated, of continuing their race without its showing any strong tendency to revert to the form of the earlier type, from which it was a well-defined departure. It proved, also, that the cross breed between them and our ancestors was a singularly successful mixture. Consequently England has been largely indebted to the natural refinement and to the solid worth of the Huguenot breed, as well as to the culture and technical knowledge that the Huguenots brought with them.

The frequency in history with which one race has supplanted another over wide geographical areas is one of the most striking in the evolution of mankind. The denizens of the world at the present day form a very different human stock to that which inhabited it a dozen generations ago, and to all appearance a no less difference will be found in our successors a dozen generations hence. Partly it may be that new human varieties have come into permanent or only into temporary existence, like that most remarkable mixed race of the Normans many centuries ago, in whom, to use well-known words of Mr. Freeman, the indomitable vigour of the Scandinavians, joined to the buoyant vivacity of the Gaul, produced the conquering and ruling race of Europe. But principally the change of which I spoke is due to great altera-

tions in the proportions of those who belong to the old and well established types. The Negro now born in the United States has much the same natural faculties as his distant cousin who is born in Africa. The effect of his transplantation being ineffective in changing his nature, but very effective in increasing his numbers, in enlarging the range of his distribution, and in destroying native American races. There are now some 8,000,000 of Negroes in lands where not one of them existed twelve generations ago, and probably not one representative of the race which he displaced remains there; on the other hand, there has been no corresponding diminution of numbers in the parent home of the Negro. Precisely the same may be said of the European races who have during the same period swarmed over the temperate regions of the globe, forming the nuclei of many future nations.

It is impossible, even in the vaguest way, in the short time at my disposal, to give a just idea of the magnitude and variety of changes produced in the human stock by the political events of the last few generations, and it would be difficult to do so in any case in a manner that would not be likely to wound the patriotic susceptibilities of many or all of us. The natural temperaments and moral ideals of different races are various, and praise or blame cannot be applied at the discretion of one person without exciting remonstrance from others who take different views with perhaps equal justice. The birds and beasts assembled in conclave may try to pass a unanimous resolution with a large majority in favour of the natural duty of the mother to nurture and protect her offspring, but the cuckoo would musically protest. The Irish Celt may desire the extension of his race and the increase of its influence in the representative Governments of England and America, but the wishes of his Anglo-Saxon or Teuton fellow-subjects may lie in the opposite direction, and so on indefinitely. My object now is merely to urge inquiries into the histori-

cal fact whether legislation, which has led to the substitution on a large scale of one race for another, has not often been the outcome of conflicting views into which the question of race hardly entered at all, and which were so nearly balanced that if the question of race had been properly introduced into the discussion the result might not have been different.

The recent attempts by many European nations to utilise Africa for their own purposes gives immediate and practical interest to inquiries that bear on the transplantation of races. They compel us to face the question as to what races should be politically aided to become hereafter the chief occupiers of that continent. The varieties of Negroes, Bautus, Arab half-breeds, and others who now inhabit Africa are very numerous, and they differ much from one another in their natural qualities. Some of them must be more suitable than others to thrive under that form of moderate civilisation which Europeans are likely to introduce into Africa, such races would spread, and displace the others by degrees. Or it may prove that the Negroes, one and all, will fail as much completely under the new conditions as they have failed under the old ones to submit to the needs of a superior civilisation to their own, in which case their races, numerous and prolific as they are, will, in course of time, be supplanted and replaced by their betters.

It seems scarcely possible as yet to assure ourselves as to the impossibility of any variety of white men to work, to thrive, and to continue their race in the broad regions of the tropics. We could not do so without better knowledge than we now possess of the different capacities of individuals to withstand their malarious and climatic influences. Much more care is taken to select appropriate varieties of plants and animals for plantation in foreign settlements, than to select appropriate types of men. Discrimination and foresight are shown in the one case, an indifference born of ignorance is shown in the other. One aspect of this question will be discussed in

the course of our proceedings, and I await the result with keen interest, and have no wish to attempt to forestall it. What I now desire to point out is the importance of a more exact examination and careful record than is now made of the physical qualities and hereditary antecedents of candidates for employment in tropical countries. We desire to judge how far medical forecast is justified by the result, and more especially to find out the conditions in youth that are prevalent among those whose health subsequently endures the change of climatic influence satisfactorily, and conversely as regards those who fail. It is scarcely possible to properly conduct such an investigation respectively.

In conclusion I wish to emphasize the fact that the improvement of the natural gifts of future generations of the human race is largely, though indirectly, under our control. We may not be able to originate, but we can guide. The processes of evolution are in constant and spontaneous activity, some pushing towards the bad, some towards the good. Our part is to watch for opportunities to intervene by checking the former and giving free play to the latter. I wish to distinguish clearly between our power in this fundamental respect and that which we also possess of ameliorating education and hygiene. It is earnestly to be hoped that demographers will increasingly direct their inquiries into historical facts, with the view of estimating the possible effects of reasonable political action in the future, in gradually raising the present miserably low standard of the human race to one in which the Utopias in the dreamland of philanthropists may become practical possibilities.

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THE KAFFIRS ARE GREAT SNUFF-TAKERS, and they generally carry a box of snuff. The women in particular are great snuffers, and after having done a little work they will set to and snuff. Squatting on the ground, and quietly enjoying their snuff—which is very strong—as the tears are coursing down their cheeks, they really look very miserable. Their snuff is composed of tobacco and a certain kind of wild aloe, which they dry, and when wanted for snuff they burn it to an ash, and mix it with the tobacco, very often adding something more to scent it.

## ON THE RELATION OF OCCUPATION TO DISEASE AND MORTALITY.\*

By WILLIAM OGLE, M.D., Superintendent of Statistics, General Register Office.

AFTER pointing out the importance of the subject, and the large influence of occupations in determining death-rate, the writer showed how satisfactory statistics of the mortality in different industries can only be obtained in countries where, as in England, the census returns give the ages of persons engaged in each industry. He then explained how his statistics were obtained, and gave the following table of comparative mortalities of men, between 25 and 65 years of age, in different occupations; the death-rate of clergymen, the lowest of all, being taken as the standard of comparison, and represented by 100.

COMPARATIVE MORTALITY OF MEN, 25 to 65 years of age, in different occupations, 1881-2-3.

Occupation.	Comparative Mortality.	Occupation.	Comparative Mortality.
Clergymen, priests, ministers	100	Carpenters, joiners	148
Lawyers	151	Cabinet makers, upholsterers	173
Medical men	202	Plumbers, painters, glaziers	216
Gardeners	108	Blacksmiths	175
Farmers	135	Engine, machine, boiler makers	160
Agricultural labourers	126	Silk manufacturers	152
Fishermen	143	Wool, worsted manufacturers	186
Commercial clerks	179	Cotton manufacturers	196
Commercial travellers	171	Cutlers, scissors makers	235
Innkeepers, liquor dealers	273	Gunsmiths	185
Inn, hotel, service	397	File makers	300
Brewers	245	Paper makers	129
Butchers	201	Glass workers	214
Bakers	172	Earthenware makers	313
Corn millers	172	Coal miners	160
Grocers	139	Cornish miners	331
Drapers	159	Stone, slate quarriers	202
Shopkeepers generally	160	Cab, omnibus, service	267
Tailors	189	Railway, road labourers	185
Shoemakers	166	Costermongers, hawkers, street sellers	338
Hatters	191		
Printers	193		
Bookbinders	210		
Builders, masons, bricklayers	174		

The causes to which the wide differences

shown in the table were then considered, and grouped under seven general headings, as follows:—

- (1) Working in a cramped attitude, and especially in one that interferes with the action of the thoracic organs.
- (2) Overwork, and especially sudden muscular efforts and strains.
- (3) Dealing with noxious substances, such as lead, phosphorus, mercury, infected hides, &c.
- (4) Working in ill-ventilated and overheated rooms.
- (5) Alcoholic excess.
- (6) Liability to accident.
- (7) Exposure to inhalation of dust of various kinds.

These causes were severally considered, and statistical tables given illustrating their action.

Among these tables are the three following, illustrating respectively the 4th, 7th, and 5th causes:—

COMPARATIVE MORTALITY OF MEN working in air of different degrees of purity, from phthisis and respiratory diseases:—

Air.	Occupation.	Phthisis.	Mortality from		
			Diseases of	Respiratory	Diseases of
			Respiratory	Organs.	Respiratory
Pure	Fishermen	55	45	...	100
	Farmers	52	50	...	102
	Gardeners	61	56	...	117
	Agricultural labourers	62	78	...	140
Confined	Grocers	84	59	...	143
	Drapers	152	65	...	217
Highly vitiated	Tailors	144	94	...	238
	Printers	233	84	...	317

COMPARATIVE MORTALITY OF MALES in certain dust-inhaling occupations from phthisis and diseases of the respiratory organs:—

Occupation.	Phthisis.	Comparative Mortality from		
		Diseases of	and Diseases	of the
		Respiratory	Respiratory	Respiratory
Coal miners	...	64	102	166
Carpenters, joiners	...	103	67	170
Bakers	...	107	94	201
Masons, bricklayers, builders	...	127	102	229
Wool, worsted, workers	130	104	104	234
Cotton workers	...	137	137	274
Quarrymen	...	156	138	294
Cutlers	...	187	197	384
File makers	...	219	177	396
Earthenware makers	239	326	326	565
Cornish miners	349	231	231	580

\* Abstract of paper read at the Congress of Hygiene and Demography.

MORTALITY OF DEALERS IN LIQUOR (25-65 years of age) from various diseases, compared with that of men generally of the same ages:—

Diseases.		Mortality of Dealers.	Mortality of Men generally.
Alcoholism	...	55	10
Liver diseases	...	240	39
Gout	...	13	3
Diseases of nervous system	...	200	119
Suicide	...	26	14
Diseases of urinary system	...	83	41
Diseases of circulating system	140	...	120
Other diseases	...	764	654
All causes...	...	1,521	1,000

### NOTABLE INDUSTRIES.\*

#### NO. 3.—BEER AND BREWING.

BEER is so universally recognised as our national beverage that it is unnecessary to dwell upon this point; and even the staunchest disciple of Father Mathew must admit that it plays a very important part in respect to English daily life. Few men, in however high a station they may have been placed, show an objection to good malt liquor, while to the man of moderate or limited means it supplies a beverage alike agreeable and economical. We say "good malt liquor" advisedly, for, unfortunately, it too often happens that the article sold as such to the public is neither good nor pure. Some years ago Mr. Phillips, analytical chemist to the Inland Revenue Department, stated that one-third of the specimens submitted to him for analysis turned out to be more or less adulterated by dishonest publicans. In fairness to the trade, it should be borne in mind that the samples which came under Mr. Phillips' notice were not brought to him until they had created grave

suspicion on the part of the Inland Revenue officers, and consequently that Mr. Phillips' remarks would apply to a section only of the trade; and we may also mention that adulteration of beer, as well as of many other articles of general consumption, is not so rife as at the period of his report.

When a publican lapses from the path of honest dealing, his method of adulterating beer is as follows:—First, he withdraws a variable proportion—two to four, or even more, gallons per hogshead—from the original beer, as delivered from the brewers, and substitutes a corresponding quantity of water; secondly, sugar, or some other saccharine substance, is added to promote fermentation, and to bring back the previous colour (we are now speaking more particularly with reference to stout and porter, technically termed "black beers"); and finally, little odd matters, such as salt to increase the flavour, and, probably, to induce thirst, grains of paradise to intensify the strength, tobacco, *coccus indicus*, picric acid, and other noxious ingredients find their way into the beer, until it has almost completely lost its proper character.

But shall there be "no more cakes and ale," because here and there an unscrupulous baker puts alum and other adulterants into the former, or a publican in his eagerness to get dishonest two-pences, instead of turning honest pence, falsifies his liquor? No, emphatically, no! Let us, however, apply our attention to the detection of adulteration, and the punishment of all offenders in this respect. The mention of Mr. Phillips' report reminds us that the investigations instituted by the Governmental department with which that gentleman was for so many years connected, are directed to the detection of offences against the Revenue, rather than of those against public health. In the newspaper reports of prosecutions by the Inland Revenue Office, much stress is laid upon the attempt to defraud the Excise, while nothing is said about the injury done to the public health. This

\* It is intended, in this series, to give descriptions of various manufactures of hygienic or dietetic interest. No. 1, "Matches and Matchmaking" (with an account of Bryant and May's works), appeared in HYGIENE, Vol. III., No. 28; No. 2, "Tobacco and Its Manufacture" (with an account of Messrs. W. D. and H. O. Wills' establishment at Bristol), was published in No. 31 of Vol. III. Each can be had of our publishers, price 6d., sent by post for seven stamps.

seems to us a great mistake. The authorities should show the detriment done to consumers; they should, so to speak, earmark the offender, and the public would deal with him—or, rather, cease to deal with him, accordingly. The prospect of losing his customers would operate more effectually in preventing the adulteration of beer, and, for the matter of that, of other alcoholic drinks, than the infliction of a money fine, perhaps wholly disproportionate to the amount gained by such acts of dishonesty as we have described. Our ancestors had a shorter and better way than we have of punishing these adulterations. The ale-conners, or official tasters, when they found a man selling adulterated drink, or giving short measure, straightway hauled the offender before the authorities, who directed his stock, if adulterated, to be confiscated and thrown into the gutter, while the culprit was placed in prison or in the pillory. If ever we should happen to become a J.P. we should urge our brother licensing magistrates to make more of the question of adulteration, instead of harassing publicans with numerous petty and vexatious charges and restrictions.

It has frequently occurred to our mind, when reading police-court charges and statistics of intemperance, that much could be done towards the reduction of drunkenness and the diminution of consequent crime, if the authorities insisted upon the supply of pure unadulterated beverages. Give a man a glass of good spirits or a pint of good beer, and he is none the worse for it; rather the contrary, indeed, for you develop his amiability and good humour, and he resumes his work with increased energy and vigour. But let him drink spirits adulterated with fusel oil, or beer poisoned with *coccus indicus*, picric acid, or some other abomination, and his moral nature, like his physical, becomes deteriorated and depraved. Many years ago, in company with a detective, we made a series of night tours of the worst parts of East London, and what struck us most at the diffe-

rent saloons we visited, was the almost demoniac wildness which men showed after drinking only two or three glasses of spirits or of malt liquor; after a bout of such stuff as was supplied to them they would have been capable of any devilry, any crime. Yet those who served them, notwithstanding the fact that they drank freely, *pour encourager les autres*, were comparatively unaffected. Our detective companion quickly solved the problem by pointing out the circumstance that the customers were supplied from a different tap or bottle.

The history of beer is lost in obscurity, though the ancient Egyptians have the credit of being the first to make this beverage, which they styled "Pelusian liquor," because it was originally made at Pelusium, a city situated near the mouth of the Nile, about 1200 years before the Christian era. Upwards of three thousand years ago! This constitutes a respectable claim to antiquity. At the present day the natives of Egypt make a drink by pouring hot water on ground barley; this compound soon ferments, and is speedily consumed, for it will not keep long. Even in Holy Writ, mention is made of the ancient Egyptian drink, to which Moses refers in two books of the Pentateuch, Leviticus and Numbers—the name applied to it by him being "schekar." A similar term is made use of by St. Luke in the New Testament, and rendered by translators into "strong drink." Many of the old Roman writers, Tacitus, Pliny, and Diodorus Siculus, for instance, have put on record that the Germans, Gauls, and other inhabitants of Northern Europe were, in their time, in the habit of making a kind of beer.

Narrowing the inquiry into this subject to our own country, we find that it was largely used at a royal banquet given by King Edward the Confessor, about the middle of the eleventh century, and that about two hundred years afterwards, viz., in 1266 (reign of Henry III.), a legislative measure was enacted, regulating the price of ale. This statute continued in force until the time of bluff King Hal, when

the question of price was left to the discretion of the justices. From Henry VIII.'s reign until that of Queen Anne, beer continued to increase in estimation (the Virgin Queen, Elizabeth, was remarkable for her predilection for this beverage), and brewing gradually developed into an art. In Queen Anne's time pale ale commenced to be brewed, and greater care was taken to improve the keeping qualities of beer, whereby the strength, colour, and flavour were also improved.

Up to the year 1730, the malt liquors in general use were designated ale, beer, and two-penny. It was usual for customers to blend these drinks, by calling for a pint of half beer and half-twopenny, or for a tankard of three-threads, meaning a third each of ale, beer, and twopenny. To obviate the trouble and waste involved in drawing from three casks to suit the requirements of one customer, a brewer named Harwood hit upon the idea of making a liquor which should combine the characteristics of the three beverages we have enumerated; this he called Entire, or Entire Butt Beer, as signifying that it was drawn entirely from one cask or butt. It rapidly grew into favour with porters and other working people, who recognised in it a drink adapted to their taste and pockets, from which circumstance it acquired the name of Porter.

It is difficult to make a sharp line of distinction between foods (true nutrients) and food adjuncts; but it is generally admitted that beer, while commonly ranked amongst the latter, possesses nutrient properties, so that it forms a useful addition to the daily dietary. Such adjuncts, as Professor Church concisely states in his treatise on Food, make our food agreeable, stimulate a flagging appetite, aid indirectly in the digestion of the nutrients, and help to render palatable food which would otherwise be wasted; further, they have some power of arresting too rapid change of tissue, etc., in the body. A well-known German professor was, like many of his compatriots, so

attached to his beer, that he was in the habit of calling it "liquid bread." We were reminded of this anecdote recently, during a ramble through Yarmouth, where we came across an old-fashioned inn, bearing the quaint sign of "The Staff of Life." Was the individual who gave it this name an admirer of the German professor's theory, or was this hostelry much frequented by bakers and millers?

Beer of modern days is very different to that of olden times, when little regard was had to accuracy of measurement of ingredients, nicety of flavour, and similar details.

Hops, now universally employed in brewing, are comparatively a modern introduction. In the reign of Henry VI. they were denounced as "an unwholesome and wicked weed," language which teetotalers may possibly be inclined to endorse. But the people who condemned hops in such unmeasured terms had had their tastes accustomed to the flavour of other plants employed for the purpose of imparting palatableness and keeping quality to malt liquor, such as ground ivy, sage, and sweet gale. These were gradually replaced by hops. Hops contain about  $1\frac{1}{2}$  per cent. of an aromatic essential principle, lupulin, possessing bitter, narcotic properties, resin, and about 4 per cent. of an astringent substance, tannin, which is useful in clarifying the beer.

Malt and hops! Surely there must be some other ingredient, as the following anecdote will show. Years ago, when the subject of adulteration began to attract attention, a brewing firm, desirous of extending their business, advertised largely, winding up their announcements with the offer of a considerable reward, if we recollect rightly £500 or £1,000, to any persons who could prove that their ales contained anything else than best malt and hops. Imagine the feelings of the brewers referred to upon receiving during the few days after the first appearance of their advertisements hundreds of waggish letters laying claim to the reward, and boldly adding to malt and

Hops, water! Yes, water undoubtedly plays a leading part in the manufacture of beer. Indeed, to this fact a large and thriving Staffordshire town, Burton-on-Trent, may be said to owe almost its existence, and certainly its prosperity. We shall have more to say upon this point by and by.

Assuming, then, that these three materials—malt, hops, and water—are used in making beer, a brief sketch of the principal processes involved will not be out of place. First, as to the malt. This is made of sprouted or germinated grain, usually barley, though rye, or even wheat, is occasionally used in some countries. The grain is steeped in water for fifty hours, absorbing during that period a large quantity of water, which causes it to swell considerably. Next it is shifted into what is technically called the "couch"; here it remains for twenty hours, in accordance with excise regulations, and the amount of duty payable is estimated by gauge. Afterwards it is removed to the "floors," where germination soon shows itself by the sprouting of the grain. The period allowed to elapse before beginning to dry the grain in the malt-kiln varies from ten to fourteen days, according to the quality of the grain, the temperature during malting, and the particular sort of beer for which the grain is intended. When it is deemed advisable to check the sprouting, further germination is prevented by putting the grain in the malt-kiln, where it is subjected to a high temperature.

In this last-named stage, as in that of germination, much skill is requisite, as the heat causes various changes, and must be proportioned to the purpose for which the malt is intended. For example, pale malt, for very pale ales, requires a temperature of about 100 degrees Fahr.; amber malt, for other ales, 120 degrees Fahr.; brown malt, for porter, about 160 degrees Fahr.; and black malt, for stout, or colouring purposes, nearly 400 degrees Fahr. The difference which the malt, after passing through the kiln, presents, as compared

with the original non-malted grain, is marked. Some of the starch has become converted into a kind of gum called dextrin, and into a saccharine substance called maltose. When malt is sifted or screened, which is necessary to remove the rootlets formed by germination, it is also found to contain a substance, known as diastase (a nitrogenous substance belonging to the albuminoids) which possesses the power of converting both dextrin and soluble starch into sugar.

The malt being ready for brewing, it is crushed and then infused in water, to extract its soluble constituents, "wort" being produced. The process of brewing is continued by pouring hot water (temperature about 180 deg. Fahr.) upon the crushed malt, and stirring up the mass continuously. This stage, termed "mashing," yields a liquor called sweet wort; this is then boiled with the hops, and next rapidly cooled. Afterwards the liquor is fermented by the addition of yeast, obtained from a previous brewing. Before the fermentation is complete it is checked by separating the yeast and drawing the beer off into vats or casks. "Fining" takes place naturally afterwards, or it may be facilitated by means of isinglass, etc.

Beer, when all these processes have been completed, varies in specific gravity from 1.014 upwards, and holds in solution numerous substances, the principal being as follows:—Alcohol, from 3 to 8 per cent.; Dextrine, about 4.5 per cent.; Albuminoids, 0.5 per cent.; Sugar, about 0.5 per cent., but greater in some kinds of malt liquor; and carbonic acid gas (also variable, and more in bottled than in draught beer), from 0.20 per cent.

Beer which is thick, muddy, sour, or hard, owes these faults to different defects in malting or brewing, to the inferior quality of the ingredients used, to a partial second fermentation, or to chemical changes which take place in the alcohol, which, upon exposure to the air, may undergo acetic fermentation, and be converted into acetic acid, *alias* vinegar.

Our readers will see from the foregoing out-

line that there is no manufacture demanding more skill at every stage, more discrimination in the selection of ingredients, and more care subsequently than that of beer. But we are stating a truism which must have occurred in everyone's experience. How often has it happened that when out on a walking expedition, driving through the country, and on other occasions, a strange hostelry has presented itself, suggesting promises of timely and agreeable refreshment, promises only to be disappointed when the wayfarer raises to his lips the tankard of malt liquor. At first taste and smell down it goes, but not down his parched throat, for the intensest thirst, the hottest day in summer, would not induce the unlucky traveller to take a deeper draught. Many years ago, with a friend, we were on a pedestrian tour throughout the West of England. The month was July, the day was, even for July, excessively hot, and as we tramped along, warm, dusty, and thirsty, we sighted a cottage near the roadside. Mending our pace, we were soon in front of it, and eagerly asked a woman who was standing in the porch for some cider, the local beverage, then, more than now, to be procured at every house in the district, however humble. The woman disappeared into the cottage, and soon returned bearing a stoneware jug, full of some fluid. We proffered her a silver coin, while our friend took the jug from her. He drank but little, and passed the jug on to us with, as we thought at the moment, and in the circumstances, remarkable moderation of his pull at the contents. Our draught was equally sparing, however, and turning to the woman we both exclaimed, in the same breath, and with excusable earnestness, "You don't call that cider, do you?" The woman who, up to then, had not said a word, slowly answered, as she dropped our shilling into her capacious pocket, "I call it *I sims*." Further enquiry elicited the explanation, "Sometimes *I sims* it's cider, sometimes *I sims*

it isn't." "*Sims*," we may observe, is a localism for "seems;" probably an abbreviation of "it seems," or "I think it seems." Since then we have never come across dubious specimens of beer, wine, tobacco, or any other article without "*I sims*" reverting to our memory.

In an earlier part of this article we referred to the important part which the nature of the water employed plays in the manufacture of beer, and mentioned Burton in exemplification of this fact.

The result of practical experience in brewing fully demonstrates that water for making ale, particularly the fine pale ale for which Burton is so famous, cannot be too hard; while the converse holds good as regards "black" malt liquors. Now, the water used at Burton is derived from deep wells sunk into the marl beds, which contain strata of gypsum, or sulphate of lime; not, as many imagine, from the river Trent, which gives the distinctive name to the town of breweries, sometimes facetiously called Beertown. The following is an analysis of water taken at Burton from an artesian boring going down to the red marl:—

	Grains. per Gallon.
Sulphate of lime	70.994
Carbonate of lime	9.046
Carbonate of magnesia	5.880
Sulphate of magnesia	12.600
Sulphate of soda	13.300
Chloride of sodium	9.170
Chloride of potassium	0.966
Carbonate of iron	1.218
Silica	1.120
Total solid residue	124.294

Nowhere else in the world can beer be brewed in such perfection as at Burton; and we need not go farther for proof of this assertion than the fact that, in addition to the old-established brewing establishments of Bass & Co., Allsopp & Sons, Worthington & Co., and Salt & Co., Burton is now the seat of large breweries started by the London firms of Charrington & Co., Truman, Hanbury, Buxton & Co., Crossman, Mann & Co., and Ind & Coope.

As long ago as the twelfth century Burton had begun to acquire a reputation for the high quality of the beer produced there, and it has, at the present day, a population not far short of 50,000 persons mainly dependent upon its malting and brewing industries.

Within the past month we have had an opportunity of specially inspecting one of its colossal breweries—the largest and most complete ale and bitter beer brewery in the world—that of Bass & Co., and we propose to give some particulars of this establishment, in order that our readers may form some idea of the enormous capital, the unceasing attention, and the army of workers required in a large brewery.

Bass's brewery was established in 1777 by Mr. William Bass, the great-grandfather of the present Lord Burton, chairman of the company which carries on the business. It now comprises, not only the original brewery erected by Mr. W. Bass (and, though called by way of distinction the Old Brewery, recently rebuilt), but two others styled—respectively the New and the Middle Brewery.

These three breweries cover 150 acres, an area equivalent to considerably more than one-third of Regent's Park, London. In addition to the breweries, the firm have in the vicinity of Burton and elsewhere thirty-seven large maltings, where the malt used at Burton is prepared. Some notion of the size of these may be gathered when we mention that for the construction of seven of these maltings, situated at Shobnall, outside the town, 4,000,000 bricks, 7,000 cubic feet of timber, and 400 tons of iron-work were requisite; each of these buildings is 240 feet long by 90 feet wide, and 35 feet in height. Another set of six maltings, at Wetmore, cover nearly five acres: each of these is upwards of 400 feet in length, and similarly proportioned in other dimensions.

We were at first at a loss to understand how the breweries, maltings, cask stores, and other huge departments were connected together, until we ascertained that the various parts of

Bass and Co.'s establishment were united by twelve miles of railway line; turning a corner in the yard of one of the breweries, we came upon a long train of trucks laden with casks of ale, ready for transference to the Midland Railway; at another brewery we saw three splendid locomotive engines waiting to be despatched to their destinations at the maltings, &c., and we were told that the firm own altogether ten of these powerful locomotives.

Enormous tanks of the purest water, conveyed by mains from the company's own wells in the neighbourhood of Burton, are placed on the roofs of the brewery buildings, besides which there are two large water towers.

Every department of the three breweries—from the malt receiving-room, the mill-room where the malt is crushed by metal rollers, the mashing-room, containing mash tuns of Brobdignagian proportions, in which the crushed malt is steeped and stirred up in hot water—astonishes the visitor by its size and the regularity with which the work is conducted. Every man knows his duty, and performs it in as steady, methodical a manner as if he were a part of the multiple machinery acting on all sides of him. There is no single detail which has not as much attention devoted to its perfection as if everything else absolutely depended on it. For instance, take the way in which the "spent grains," *i.e.*, the grains which have been finished with in the mashing-rooms, are disposed of; along the outside wall of the building there is a lofty, extensive platform, on which are placed a number of large square timber boxes; these receive the spent grains from the mash-tuns; afterwards the grains go down a slide, which, upon a trap-door being withdrawn, allows them to pass through, so as to fall into the farmers' waggons, or railway trucks, drawn underneath.

One room, of vast dimensions, we christened the Museum, for it contained sample casks of every brew, each carefully labelled for reference, more numerous than we should care to have to

count, even on the longest day. Speaking of casks reminds us of one of the most interesting features, the cask factory, including the largest steam cooperage in England, and occupying, with the workshops and sheds connected with it, nearly three acres of ground. The staves of best timber, obtained from the Baltic and elsewhere, are stacked at Shobnall, a mile from the breweries, for seasoning, until wanted at the cooperage, the stacks taking up a ground area of more than twenty acres. Thence they are conveyed on the firm's railway trucks to the steam factory, a lofty open-roofed building, 200 feet in length by about 100 feet in breadth. Here every conceivable operation requisite for cutting, shaping, and finishing off the staves is performed by machinery. In another department the cask-heads are similarly constructed, and all the pieces are formed with such mathematical precision that in the outer workshops the workmen can quickly adjust them, together with the strips of hoop iron manufactured by special steam machinery into hoops. Even the branding of the name of the firm and numbers of the casks is effected by machinery. The room in which the casks are placed for delivery to the firm's railway trucks is a handsomely shaped hall, with a cable roof, 160 feet long by 60 feet wide. Before the erection of the St. George's Hall and the Burton Institute, it was frequently fitted up for theatrical and other entertainments given by the Carl Rosa Opera Company, etc., and is sometimes used as a dining-hall for the local volunteer force, of which Lord Burton holds the colonelcy. In adjacent sheds there are very elaborate arrangements for washing and cleansing by steam jets all casks which have been returned, so as to render them sweet before being again sent out. Before leaving this department we may quote an extract from Mr. Barnard's interesting work on the Noted Breweries of Great Britain:—"The stock of casks necessary to carry on the company's

business is as follows: 40,499 butts, 133,464 hogsheads, 127,592 barrels, 147,969 kilderkins, and 68,597 firkins, making a total of 518,121 casks. The firm exports annually to foreign countries 25,000 casks, which, placed end to end, would reach fifteen miles; while those delivered in the United Kingdom would, in the same way, cover the distance from London to Edinburgh" (400 miles).

Electric lighting is used for the steam cooperage (gas being deemed unsafe), as well as for the yards and roads which intersect the breweries. Other precautions against fire are admirable, like everything else connected with this brewing wonder of the world. At the Company's own fire brigade station in Middle Brewery Yard, there is a complete system of signals, under the charge, day and night, of a skilled man, whose duty it is, directly there is a call of fire, to set in action a number of electric bells, communicating with the superintendent and his men. Two fire engines—a Merryweather steamer and a manual—are kept in constant readiness, while the horses stand harnessed in the adjoining stable, and ready to go out immediately. How quickly the engines can be turned out is shown by the fact that they have been got ready to start for the point whence the alarm has been given, in three minutes at night, and less than two minutes in the daytime. To facilitate a rapid turn out the firemen are provided with houses situated within 200 yards of the engine-house; and a plentiful supply of water is assured by nineteen water cisterns, each holding 12,000 gallons, supplied from the tank on the top of the Old Brewery, at different parts of the buildings, connected by pipes with a system of mains and hydrants throughout the premises. The result of these thorough precautions against fire is that Bass and Co.'s breweries have never suffered from any disastrous conflagration; and as the firm send their brigade to any fire that may occur in the town, they benefit Burton in this as in many other respects.

It must not be supposed that in this necessarily brief sketch of Bass and Co.'s establishment we can even mention every separate branch. The various shops occupied by carpenters, fitters, blacksmiths, wheelwrights, and other handicrafts are perfect of their kind. The firm have their own printing office, from which more than one hundred millions of bottling labels are issued to their customers annually. There is a model or experimental brewery, under the supervision of Mr. C. O'Sullivan, F.C.S., the chemist to the firm; model in respect of perfection, though not on the small scale generally conveyed by the term "model," for it is a neat brick building of four floors, where every operation requisite in brewing can be carried out and carefully noted. There is also a complete experimental malting-house, where Mr. R. W. Abbotts, the manager of the malting and grain departments, tests the value of the barley purchased by the firm.

The general offices, situated in High Street, contain a set of large rooms full of clerks occupied in the multifarious business operations of the company. In the cask office alone (96 feet long and 30 feet wide) no fewer than thirty-five clerks are constantly employed in checking off the numbers of casks going out to or returned by customers. While business arrangements have been fully provided for in the general offices, architectural embellishment has not been lost sight of, and the splendid stone staircase leading up to the boardroom and managerial offices on the first floor is a remarkable piece of workmanship, with its polished alabaster balusters and marble columns and handrails.

After our inspection of the general offices, Mr. Guy Abbotts (of the brewing department), our genial, instructive, and untiring guide, without whose aid we ran numerous risks of being lost in our progress through Bass & Co.'s labyrinthine establishment, invited us into "the club." The completeness and character of the arrangements led us to imagine, at first, that it

was the principal social club of the town, but all that we had seen during our day's ramble prepared us for the information that it was provided by the firm for the use of the clerks and other officials. In addition the firm have a thoughtful care for the comfort and recreation of their workpeople; an institute, reading-rooms, dining-rooms, and rooms for various amusements testify amply to this. We should not omit to mention that a branch of the Post Office Bank is located on the premises, specially for the employés, and that, with the view of encouraging thrift, the firm liberally make up the interest from  $2\frac{1}{2}$  per cent. (the Government rate) to 5 per cent.

We will conclude our article by citing some figures (in addition to those already given), for they represent plain facts, and, as such, are superior to mere verbal statements. Bass and Co. employ at Burton nearly 3,000 people. They consume annually 80,000 tons of coal and 2,000 tons of coke. Their yearly turnover is £2,500,000, and their contribution to the national revenue exceeds £800 daily. The annual output of their three breweries is 1,000,000 barrels. The quantity of land that would be required to grow barley sufficient for their twelve months' supply is 70,000 acres, while their consumption of hops during the same period (about 38,000 cwts. per annum) is equal to the production of 4,000 acres.

EDITOR.

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### BLOCK DWELLINGS FOR THE INDUSTRIAL CLASSES.

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BY JOHN F. J. SYKES, B.Sc., M.B., Medical Officer of Health for St. Pancras.

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*(Concluded from page 318.)*

ON a large area the increase of cubic space would be proportionately greater. For instance, if the area were double the depth and length (11.4784 acres), then under the same conditions

the following would approximately be the amount of cubic space enclosable per acre:—

1 story high	320,220	
2	501,950	$= 56.7$
3	614,300	$= 22.3$
4	687,000	$= 11.8$
5	736,000	$= 7.1$
6	766,650	$= 4.1$
7	786,800	$= 2.6$
8	798,450	$= 1.4$
9	803,800	$= 0.6$

Increase  
per cent.

So that, given an area, the greatest amount of cubic space enclosable with due regard to health provisions may be calculated, and the cubic space adopted as a uniform standard more valuable than the mere number of tenements, or of rooms, or the square space, as a basis of calculation for the size of block buildings, cost, accommodation, density, and mortality.

Restriction of time will only allow of a brief but sufficient reply to the prevalent objections to blocks.

It has been urged that block dwellings are repellent, from their unsightliness, to the classes sought to be attracted; but it is a poor compliment to the resources of architects to attribute to them inability to provide embellishment at moderate cost by beauty of form, colour, and ornament. The objection that the working classes avoid them on account of their collective arrangement, and the objection that a class superior to those they are intended for takes possession of them, as well as the fact that residential flats are in favour, may be left to the objectors to reconcile with the construction of the dwellings and the habits of occupants.

It has been anticipated that blocks may rapidly deteriorate; but when substantially constructed, with due regard to sanitary and social requirements, their condition will depend upon efficient supervision and maintenance. Under proper management the one roof, drain, staircase, water-supply, gas service, &c., upon which so many are dependent, is less likely to remain defective or unremedied than when under less direct supervision, and with fewer to complain, as in smaller buildings. Only

improper usage can cause deterioration, and this applies equally to the small as to the large building.

The staircase open to the street is rightly regarded as a most objectionable feature. The staircases of tenement houses whose front doors are rarely closed are largely accountable for the defilement and destruction in this class of houses, and the same deterioration will ultimately doubtless take place in the blocks which replace them. It is necessary to distinguish between being open for the purpose of light and air, and being open to the access of any and everybody who chooses to enter. The former is as highly beneficial as the latter is detrimental. The staircases should open into the intervening space between the rows of blocks, but there should be only one public or main entrance to the courtyard or garden of block dwellings, and this should be directly under the control of the superintendent. The legislature is largely responsible for these open staircases, by the unreasonable manner in which the inhabited house duty is assessed, which compels the staircase to be open and form part of the street in order to claim exemption for the dwellings under £20 a year (7s. 8*1*/<sub>10</sub>d. per week) rental. This is a condition that urgently requires alteration.\*

Apart from the influences of town life, is there any reason to suppose that block dwellings are *per se* unhealthy? Residential flats are not held to be less healthy than self-contained houses. Provided that the proportion of open to covered space is adequate to permit of proper access of sunshine and daylight, of sufficient aeration and perfusion, increased height of building can scarcely cause any direct injury to health. On the other hand, the conditions of life are dissimilar in cottages and in blocks in important respects.

\*The Customs and Inland Revenue Act 1891, that has only just become law, indirectly removes the obstruction hitherto existing to the construction of Block Dwellings with one main entrance under the Superintendent's control.

In block dwellings the families, and especially the children, are brought into closer and more frequent contact, and the sanitary arrangements are under more constant supervision. The effects of these conditions upon the mortality, as compared with London generally, have been most ably demonstrated in a paper upon the vital statistics of block dwellings read before the Royal Statistical Society in February of this year by Dr. Newsholme. He showed that, notwithstanding that the age-distribution of population in Peabody Buildings was much less favourable to a low mortality than in London as a whole, the death rate was 2 per 1,000 lower, and that the birth-rate was much higher, and the infantile mortality much lower than in all London. But that the death-rate of children between one and five years of age was higher, and was caused by scarlet fever, diphtheria, and still more largely by whooping cough and measles, diseases to which children are so prone, and which are communicated mainly by direct infection. In this respect the social condition induced by block dwellings resembles schools, and is equally remediable. Another point elucidated was the influence exerted by the greater supervision of sanitary arrangements, in the fact that the death-rate from typhoid or enteric fever was one-half that for all London, and it is well recognised that this disease is the best test of sanitary conditions available.

Time, again, will not permit of the consideration of the various classes of block dwellings, but the distinction between dwellings with private sanitary and domestic conveniences and those with conveniences in common is important, as it materially affects the social conditions, as well as the cost, and also the cubic dwelling-space available. The higher aim should be to construct blocks of "homes." This may be supplemented by baths and wash-houses supplied with hot and cold water and hot drying closets, a mortuary, means of isolation for minor infectious ailments, possibly a reading and a

recreation room, or any addition that may make the workmen's quarters in towns desirable residences according to the rental they can afford; and efficient regulations must be trusted to complete the work.

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## ON THE NEED OF SPECIAL MEASURES FOR THE PREVENTION OF CONSUMPTION.

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By ARTHUR RANSOME, M.A., M.D., F.R.S.,  
Physician to the Manchester Hospital for  
Consumption, etc.

THAT consumption is both curable and preventable will be acknowledged at once by all medical men who have had any experience of modern methods of dealing with the disease. But this truth would hardly seem to have made its way into the public mind, and if we are to judge from the excitement that was roused by Dr. Koch's announcement of his supposed discovery of a cure, it would seem that many even of the medical profession are not very firm believers in the efficacy of ordinary methods of treatment.

It may be necessary, therefore, to state that its curability is attested (1) by the reports of many pathologists as to the presence of evidence of healed phthisis in a large proportion of bodies examined after death in public institutions. Many thousands of such examinations have now been made, and the results show that from 25 to 50 per cent. of persons dying from other diseases than phthisis give signs of spontaneous cure of tubercular disease. (2) The testimony of all the most eminent modern physicians is to the same effect, thus Dr. James Pollock, Dr. C. J. Williams, Dr. Austin Flint, Dr. Douglas Powell, amongst English observers, and many others, from Niemeyer to Virchow, all concur in the opinion that consumption is distinctly curable.

From my own observation, both in private practice and at the Manchester Hospital for Consumption. I have arrived at the conclusion

that, where all the necessary conditions of treatment can be fulfilled, consumption is decidedly a manageable disease; and although there are some constitutions so feeble, or so vulnerable by the organism, that the disease spreads through the body after one infection, yet in the large majority of cases a fatal issue is brought about not by one or two, but by repeated, invasions of the bacillus derived from the unhealthy environment in which these persons are obliged to live.

With regard to the preventability of the disease we have also a strong basis for our assertion.

1st. In the marvellous results that followed the improved drainage and ventilation of the barracks of the British army in all parts of the world. Before the year 1854 the mortality from lung disease amongst the picked population of these dwellings was a scandal to the nation, and was enormously greater than that of the ordinary inhabitants of our towns, especially in the battalions sent to warm climates, such as those of India, Ceylon, the West Indies, the Mediterranean, etc. Thanks to the above-mentioned measures, it now stands at from one-third to one-tenth of its former rates.

2. The influence of improved drainage has been shown by Dr. Buchanan, in his table of towns, contrasting the mortality by phthisis and other diseases before and after the introduction of improvements in this direction.

3. And, lastly, by the reduction of the general phthisis rate of the country from 2,602 per 1,000,000 in 1867 to 1,542 per 1,000,000 in 1889.

It can hardly be doubted that the saving of 30,000 lives every year, from this cause alone, which is implied by these figures, is due to the sanitary improvements that have been steadily going forward since the passing of the beneficent Public Health Acts of 1868 and 1875. But if consumption is preventable, there must exist a very large proportion of the population to be protected from the disease. It has been calculated

that there are at least 150,000 sufferers from phthisis constantly present amongst us, and we may add to these persons not only an unknown number of susceptible individuals who have not taken the disease, but also the large number of cases of cured phthisis.

The fact that consumption is curable, and that a certain large proportion of persons survive after one or more attacks of the disease, adds, in truth, greatly to the importance of preventive measures; for it increases the number of susceptible persons who have to be protected from its ravages. These persons have not only been proved to be vulnerable by the organism, but their constitution has been impaired, their injured lungs are less elastic and more ready to harbour the bacillus, and to nurse it into active virulence. Such patients also naturally shrink from the only certain antidote to the poison, a plentiful supply of fresh outdoor air. Believing, as most of them do, that their ailment has arisen, as indeed it often does, from a chill, they strive to avoid this accident by the worst means that they could adopt, namely, by shutting themselves up in close rooms, already loaded with organic impurities, and often charged with virulent forms of the germs of such diseases as pneumonia, catarrh, and even of tubercle itself. They keep their bodies over-clothed, heaping upon the chest coverings that reek with impurity, and that are often themselves a source of pestilence. These persons are thus peculiarly liable to a recurrence of the disease. There exists thus a large mass of preventable disease to be dealt with by sanitary authorities, more in amount than that of any other preventable disorder. It exceeds even that from all the zymotic class put together, for whilst epidemic diseases of all kinds now kill only about 45,000 persons annually in England and Wales, phthisis and other tubercular complaints carry off no fewer than 70,000.

The chief means for the prevention of tubercular disease are also not difficult to find when

we fairly consider the chief sources from which it spreads. I do not make light of the many predisposing causes of the disease, the weak constitutions inherited from parents, the tendency to disease acquired by injury to the lungs by irritating dusts, or other substances derived from manufactures; by stooping or constrained postures during work; the catarrhal pneumonias and other chest diseases due to exposure to cold and damp; the insufficient and in-nutritious foods, and so on; but if we are to prevent the entrance of the organism into these enfeebled bodies, the supply of the specific microbes from without must be cut off.

We may, perhaps, be unable to prevent the rare forms of infection by direct transmission from the mother, or by personal intercourse, but the case is quite otherwise with such sources of the disease as the ingestion of the milk or flesh of tuberculous cattle, or the inhalation of tuberculous dust. Both these should be carefully guarded against, and we may fairly appeal to our medical police to shield the population as much as possible from these dangers. It would probably not be difficult for sanitary authorities to prevent the first of these evils. It would simply be necessary to have more thorough and more scientific inspection by experts of both meat markets and dairy farms, and there would need to be greater solidity between urban and rural authorities than now exists.

But the case is quite different with the prevention of infection by tuberculous dust. All the chief authorities on tubercle are agreed as to the gravity of this source of danger. We have the direct researches of Koch, Bollinger, Galtier, and others, as to the prolonged vitality of the bacillus in tuberculous sputum. Cornet has shown also that the sweepings from the walls of sick rooms and of hospitals will convey the disease, and I have myself proved that in an insanitary house in Ancorats and in other unhealthy areas, sputum will retain its virulence for two and a half months or even longer.

The evidence also is very strong that the

spread of phthisis is greatly promoted by residence on damp soils, or in ill-ventilated rooms. On the former point I need only mention the researches of Bowditch and Buchanan, confirmed by the Registrar-General of Scotland and by Dr. Haviland. With regard to the latter also we have an abundance of evidence from Dr. Farr, Dr. Parkes, Sir J. Simon, Sir Douglas Galton, Drs. Nevin and Tatham, and many others. It is also extremely probable that infection once introduced into a house clings to it for a length of time, for whilst direct or mouth-to-mouth infection is extremely rare in this climate in well ventilated rooms, the records of the Collective Investigation Committee of the British Medical Association give many instances in which the disease has recurred again and again in certain unhealthy houses. My own observation in Manchester and Salford, and those of Dr. Irwin in Oldham, and of Dr. Flick in Philadelphia, point to the existence in towns of tubercular areas and infected houses.

Under these circumstances it seems to me that the duty of sanitary authorities is clear. They should regard phthisis as a disease to be dealt with on precisely the same lines as the analogous diseases typhoid fever, cholera, and leprosy, diseases, namely, which are slightly, if at all, directly contagious, but which spread by material thrown off from the bodies of the patients. The means to be employed to this end would also be very similar, for they would be the time honoured methods of (1) Notification of cases, (2) Disinfection, (3) Hospital accommodation; and (4) General sanitary measures, such as ventilation, drainage, and reconstruction of unhealthy areas.

1. *Notification*.—At first it may sound somewhat novel to demand that a slowly progressing ailment like phthisis should be notified, as if it were liable to become an epidemic disease; but, after all, we may fairly inquire whether the purpose of notification is not the prevention of any disease that may be arrested by early intelligence of its existence being sent to the

the health officer; nor would there be much difficulty in obtaining the notification of phthisis. Although phthisis is not directly contagious, there would be nothing unreasonable in classing it with other diseases that need special measures to prevent its spread. Under the recently-passed Notification of Diseases Act, many local authorities have included enteric fever in their schedules, a disease precisely similar, in the attribute that it is rarely, if ever, directly infectious, but which spreads mainly by means of excretions, from the patients suffering from it. There would also be nothing strained in interpreting the words of the Public Health Act of 1875, in the clauses relating to infectious disease, so that they should mean that special measures must be put in force to prevent persons so situated from sowing around them the virulent particles coughed up from their diseased lungs. It would, doubtless, be necessary to take special precautions to prevent the repeated notification of the same case of phthisis, but by means of a careful register I have no doubt that this could be accomplished. The organization of our sanitary police is sufficiently complete to enable it to keep such cases under surveillance and control.

2. *Disinfection*.—After receiving notice of a case of tuberculosis, the next step to be taken by a local authority would be to ascertain whether proper care is, or can be, taken to prevent injury to the public health. In the case of well-to-do persons the information given by the medical attendant would be sufficient, but where the case is that of a poor person it should be visited, and the local authority should see to the regular cleansing and whitewashing of the premises, and to the disposal of excretions, especially of the expectorated matter. If necessary, disinfection by sulphur, and the stoving of clothes, should be carried out. Paper spittoons that can be burnt should be insisted upon. After death also measures should be taken for the cleansing and disinfection of house, bedding, and clothes.

3. *Hospital Accommodation*.—There would next come the question of the propriety or possibility of removing the sick person to hospital. So long as he (or she) could work, and so long as he would consent to use the necessary means for destroying the infective material, it would be unnecessary to do more than I have already indicated; but when the patient becomes unable to follow his employment, and the family are obliged to seek for assistance from the parish, he has a claim to be received into the workhouse hospital, and such an asylum should be offered him, and should be made as little humiliating and as free from ignominy as possible. I would also put in a plea for those who are not reduced to pauperism, but who could be removed to hospital to receive appropriate treatment in the wards. Towards the close of their illness, people who live in close, confined dwellings, become a serious source of danger to the rest of the family, and as they are without proper lodging and accommodation for the safe treatment of such a disease, I would submit that it would be a legitimate expenditure on the part of local authorities, if they were to provide male and female wards for the reception of such cases in connection with their hospitals for infectious diseases. Although consumption is not directly infectious, its products are undoubtedly infective under certain conditions, such as have been mentioned, and local boards would be taking the right measures for preventing the spread of disease if they were to make such provision; there are probably few exanthematous diseases that can be so easily and effectively controlled.

4. But it is probably to *general sanitary measures* that we must look for any large reduction in the rate of mortality from tubercle. It has been found that deep and thorough drainage of the subsoil will greatly diminish this mortality. In the case of Salisbury, as you are probably aware, it was reduced by one-half, and similar reports have come from other towns,

and though the same result has not always been obtained elsewhere, there can be no doubt as to the importance both of draining and concreting the foundations of dwelling houses, so as to prevent organic vapours from rising along with the ground air into living-rooms.

I think, therefore, that we shall not be far wrong in ascribing to the better drainage of the country a large part of the recent diminution in the death-toll levied by phthisis.

Ventilation, again, seems effectually to stop infection from tubercle, when it has been thoroughly carried out. It is well known that the sole measures that so greatly reduced the death-rate in the army, between the years 1854 and 1868, were the better drainage and ventilation of the barracks. Even before the discovery of the infective character of tubercular sputum, and therefore before any special means for their disinfection were employed, it was proved that the excellent ventilation of the wards of our great hospitals for consumption effectually preserved the attendants upon the sick from any harm. I believe, also, that it is extremely rare in this country for consumption to be conveyed from person to person even under circumstances where there exists the closest personal contact, when the house is cleanly, the ventilation good, and the drainage properly attended to.

It is somewhat difficult to say in what consists the disinfecting power of plentiful supplies of fresh air. General cleanliness often goes along with good ventilation, but there are many instances of immunity from consumption, even where the surroundings are of the most filthy description. It is well known that the islanders of St. Kilda, and of many of the Western Hebrides, are almost free from the disease, and yet their well-aerated hovels are filthy in the extreme, the manure of the animals that are allowed free entrance being allowed to collect upon the floors until sufficient quantity is collected to be carted away into the fields, and similar conditions prevail in many other places

where phthisis is yet very uncommon, as in the homes of the Tartars of the Steppes, and the tents of the nomad tribes of Arabs, gypsies, &c. It is for this reason that I have ventured to suggest that where consumption is prevalent there must exist some special nutriment in the air which either (1) serves to prolong the life of the bacillus of tubercle, or (2) which may even increase its virulent properties, this special element in foul air being either the organic matter exhaled from human bodies, or the emanations from polluted ground air from badly drained subsoils. I should imagine that either of these hypotheses might account for the result, and certainly in the few experiments which I have carried out to find the conditions that modify the virulence of the bacillus, it was proved that foul air caused the organism to retain its power for evil much longer than when it was exposed to pure fresh air and light.

Viewed in relation to the prevention of phthisis, however, the subject of ventilation, or rather the purification of the respired air, is a very large one. It involves not only the mechanical problem of admitting to living rooms a sufficient number of cubic feet of the outer air, but it includes the removal of what has been aptly termed the air sewage, from that air, and from the air of all places where human beings congregate. In the streets of towns there must be free course given to the winds of heaven; there must be no blind alleys or streets closed up at one end (in the investigation into the phthisis distribution in Manchester and Salford which I have already mentioned, these conditions proved to be a powerful factor in determining the increase of the disease). Accordingly, whilst it is very important that houses should be made healthily habitable by securing thorough ventilation, that back-to-back houses and undrained and un-aerated basements should be utterly abolished; in other words that the cave-dwellers of modern times should be provided with decent and healthy tenements; whilst workshops and factories

should be properly ventilated and freed from dust; whilst schools and places of public assembly should be more efficiently supplied with a sufficient flow of air in proportion to their temporary inmates; whilst all this is being attended to, more thoroughly than it is at present, greater attention must also be paid to the laying out of the streets, and to the condition of the outer air.

To satisfy those requirements the local authorities of most of our large towns will have to undertake extensive works of sanitary reconstruction, and will have to put in force the strongest powers that they now possess for the prevention of pollution of the atmosphere by smoke and noxious vapours; and they must provide ample lung space in the shape of public parks and open playgrounds. There can be no doubt that in order to carry out these views and to lower the fearful death rates from diseases of the respiratory organs and from infantile diarrhoea that now prevail in certain well-known unhealthy areas in such towns as Manchester, and Salford, and Preston, it will be necessary to entirely reconstruct portions of those towns.

It is possible that these may be regarded as somewhat strong proposals, but at least they have the merit that they may all be put in force without any material increase in the powers now possessed by local authorities. The only thing needed to enable them to be carried out in their entirety, is a powerful public opinion to back them up. When people generally, and especially the working classes, realise that a large part of their sickness and consequent loss of time and money is due to neglect, they will unquestionably be on our side. The undertaking possesses, moreover, the further merit that not only will all this sanitary improvement prevent consumption and other tubercular diseases by doing away with the sources of infection, but it will also prevent them by raising the general standard of health amongst town dwellers. It will so strengthen those who are already predisposed to the disease that they will more readily throw

off any stray germs of tubercle that may find an entrance into their bodies. It will conduce to spontaneous cure, will prevent recurrence of the disease, and will ward off attacks from those who are now healthy.

I am not so sanguine as to suppose that the work of preventing phthisis will all be accomplished in the course of a few years. As Mrs. Browning says:—

“The world we're come to late is swollen hard with perished generations and their sins.”

There still remain nearly 70,000 lives per annum to be rescued from this fell disease in England and Wales alone. I conclude by asking, in the words of the same poet:—

“Who, being man, can stand calmly by,  
And view these things, and not tease his soul  
For some great cure ?”

## CURIOSITIES OF THE GAME TRADE.

By DR. A. J. H. CRESPI, WIMBORNE.

“THE trade in game is a strange one,” wrote Mr. George Dodd, in his “Food of London,” a most instructive and, at the time when it was first published, in 1856, a most exhaustive work. The foreign game and poultry trade with this country is now positively gigantic. We have imported this year, in splendid condition, 1,200,000 fowls, 500,000 ptarmigan, 200,000 black game, above 10,000 partridges, and over 1,000,000 of wild ducks. The vast bulk of all this comes from Russia, but immense shipments, especially of ducks, come from Norway and Holland, while there is reason to expect that the Dominion of Canada will soon send us large supplies.

It is instructive to contrast these figures with those given by Mr. Dodd thirty-five years ago in the “Food of London.” The quantities of game then annually sold in Newgate and Leadenhall markets were about 1,850,000 head, including native and foreign articles, and of this total 850,000 were rabbits. Larks came next, yielding an average of 100,000, partridges

touched 150,000, and pheasants only 64,000; grouse stood at 57,000, while snipe went up to 107,000; and ranging between a maximum of 40,000 and a minimum of 10,000 came plovers, woodcock, widgeon, and teal. The hares in those days numbered a little over 100,000; and Newgate Market had also the credit of selling 40,000 stone of venison a year. Foreign game was beginning to reach us as an important item in the food supply, while the trade in Ostend rabbits, killed and skinned in Belgium, was rapidly increasing. Still more curious cargoes occasionally arrived. Thus, in 1856, a shipment of seventeen thousand quails was made at Civita Vecchia to Liverpool, whence the welcome little strangers were conveyed by rail to London. It must be remembered that large though the consumption of game was when the "Food of London" was written, the trade was, comparatively speaking, in its infancy. Only twenty years before the publication of this remarkable book the sale of game was absolutely illegal, and it was only with danger and by subterfuge that it could reach the market at all. The grim shadow of William Rufus and the forest laws continued to frown on the dinner tables of the middle classes. Down to the accession of William IV. a heavy property qualification was required for the right to kill game, and fearful penalties were inflicted on unqualified persons for killing game, and for having engines for snaring it, or even being in the possession of it. The laws against poaching are still stringent enough, but they are not so barbarously tyrannical and inhuman as was the case two generations ago. Although by the Act of William IV. every person who had taken out a certificate was entitled to shoot game, subject to the law of trespass, which included the prohibition to kill on public roads and highways, it was not until the passing of the Acts, Victoria I. and II., that permission was granted to sell game, the dealers being allowed, and indeed required, to take out an annual licence. Up to this time the most

extraordinary subterfuges had been resorted to to evade the law. Nevertheless, in spite of the penal clauses, there was little difficulty in obtaining a hare or a pheasant for dinner, but when the bill was made out the hare was charged as a "lion" and the pheasant as an "eagle," or something equally ingenious. From this underhand method of game-dealing arose one of our strangest national peculiarities. We are believed to be the only civilised nation who invariably, and from preference, eat game "high," and woodcock and venison in an almost putrid condition. The reason for what might otherwise be regarded as a depraved taste among English epicures is that in the last century the nobility and the squirearchy were often greatly puzzled to know what to do with the game they shot. They could not eat pheasants, partridges, and hares every day. Had they done so, satiety, or perhaps blood-poisoning, would have resulted. Even fat haunch of venison and venison pasty become cloying after a while. They might make presents to their neighbours, but their neighbours were principally noblemen and squires with ample preserves of their own. So the game was smuggled up to London, and "swapped" for fish, and the fishmongers, in the course of their business, sold it to rich merchants and professional people, with no preserves of their own. But during its sojourn in the squire's larder, its abode in the lumbering wagon which brought it to the metropolis, and its residence in the fishmonger's cellar, the game had usually become exceedingly "high," and the gourmet classes in time became as fond of high game as George I. was of bad oysters. His Majesty could get no others in Hanover, and had to be satisfied with what he could get; and his middle-class subjects were, as regards game, in the same predicament, and, if they wanted to eat game, had to be content with it decidedly high. Working people are, as a rule, not fonder of game than of claret. Our domestic servants will neither eat the one nor drink the other, and their prejudices are shared by the

lasses from which they are drawn. The poor man and his family, however, delight in rabbits. Bunny boiled, "smothered in onions," roast, baked, hashed, or in a pie, is a viand of which those whose lot it is to labour with their hands never tire; and rabbits, all things considered, are cheap enough. Hare is not popular; it will not boil soft; it is a dark, dry and unattractive meat, which, if it be roasted, must be lubricated and basted with large quantities of fat before it eats tenderly, and the jugging is far too expensive and tedious for the poor man's limited resources. It makes admirable soup, but the poor man's wife remains hopelessly in the dark as to the preparation of any soup except kettle broth, which seems to consist mainly of hot water. It is among the upper classes, the genteel section of society, that those are to be found who would be affected by a diminution in the game supply. The habitual eating of game has come to be a regular part of the scheme of modern civilisation; that is to say, of the refined and picturesque civilisation, which likes snowy napery, bright plate, shining crystal, and pretty flowers on its dinner table. A little dinner of six is not complete without a dish of game before the sweets and cheese; nay, at much smaller symposia, at dinners perhaps, at which the only guests are husband and wife, or a couple of friends, the *pièce de résistance* is often a pheasant, a partridge, a grouse, a brace of woodcock or a wild duck, instead of a joint. Thousands of people with moderate incomes and without any wish to be extravagant, like to live "nicely," and to this very numerous class any diminution in the supply of game would be a serious grievance.

SOMETHING LARGE IN WINE CELLARS may be seen by visitors to the establishment of Moët and Chandon at Epernay. The cellars of this world-known firm are cut out of the solid chalk under a hill, and comprise a superficial area of about 100,000 English square yards. They are lighted by the electric light, and contain some millions of bottles of champagne, in addition to a prodigious quantity of old wine preserved in casks for the purpose of admixture with the new vintages. The persons employed by Moët and Chandon number several thousand men and women.

## THE SCIENTIFIC OBSERVATION AND STUDY OF CHILDREN IN SCHOOLS, AND THE CLASSES INTO WHICH THEY MAY BE GROUPED.\*

By FRANCIS WARNER, M.D., F.R.C.P., Physician to the London Hospital, etc.

ASSUMING that it is desirable to know the condition of the children in a school, I am of opinion that two independent reports on schedule forms should be made of all children considered by the reporters as presenting points worthy of notice (1) by the teachers, visitors, inspectors, etc., (2) a scientific report based upon viewing each child while still and also while performing some simple action. My province deals with the latter method of report.

Children can best be seen in a large and well-lighted room; some of the London Board schools have halls admirably adapted for the purpose. The children being drawn up in ranks, a standard at a time, or in groups of about forty, the observer can view each individual. It is convenient to fix the child's eyes while he is under observation by asking each in turn to look at an object held up (I use a shilling at the end of a pencil). The trained observer can read off the physiognomy of the individual features and their parts, the facial action and expression, the eye movements, the balance of the head and body, etc., as quickly as a printed line. The children are then requested to hold out their hands straight, the action being shown them momentarily; the action and balance are noted as a further indication of the condition of the nerve-system. Finally, the palate is inspected in each case. At each stage children presenting deviations from the normal are asked to wait with the teacher. Any cases not picked out may now be presented by the teacher; the selected cases are kept, the rest are dismissed to the class room. Each of the selected cases is then reviewed individually, and the schedule form

\*A paper read at the International Congress of Hygiene.

is filled in, conditions printed on the schedule are ticked if normal, and deviations therefrom are verbally described. The teachers' report of mental status is entered or filled in by them afterwards. In this method a fairly uniform standard of observation can be maintained. A tape measure for the head circumference is useful; occasionally some detailed inquiries may be made, or some brief mental examination conducted with the teacher may be desirable, but, as a rule, no questions were asked of the child. Time prevents me from giving details of my methods of observation, and the signs observed, but these have been published. This method works smoothly and uniformly—going through 106 schools—with a minimum of trouble to teachers and pupils. The teachers generally acknowledged that the dull children in the school had been picked out by observation.

The following remarks are based upon the observation of 50,027 children in schools, which I undertook for a joint committee of the British Medical Association and the Charity Organization Society. Analysis and study of these observations suggests various classes or groups of children we are concerned with, their scientific definition, their relative numbers, and distribution.

The classes or groups of children found in schools :—

(1.) Children well-made, with a nerve system acting well, and average or bright at school work.—Of these there were among the 50,027 seen—boys, 21,315; girls, 19,536; total, 40,851. Such pupils are the average or normal, hence they do not appear further in our tables. It is seen here, as in most other cases, that the girls are better than the boys. In this work search was made for the abnormal and pathological; it would be interesting to re-examine these normal children to determine points of relative excellence, searching for those best developed in body and mental faculty; this could be done. Scholarships would be most advantageously given to the best made children.

(2.) A group similar to the last, but slow at lessons (reported dull by teachers), *i.e.*, children presenting no defects to the observer who does not use mental tests.—It is important to differentiate such pupils from those with defective brain conditions. Some children's bodies and brains are well developed and sound, though presenting no present faculty for school lessons, as the teachers' evidence shows. The mental examination and history may, on the other hand, show grave defects in intellectual and moral faculty. Many of this group were "eye cases," some "cripples," several were presented by the teachers, not having been noted by us. An analysis will be given in the full report.

(3.) Cases preventing defects of development of the body of various kinds.—It is not intended to represent children as exceptional from an educational point of view because some defect was present. Analysis of the various defects shows them to be of different importance. This subject has been dealt with in another paper, demonstrating their relative correlation with "mental dulness," "abnormal nerve signs," and "low nutrition" respectively.

(4.) Cases presenting abnormal nerve signs.—Their significance varies in two directions: the one group is associated with low development, the other with delicacy and nervousness; they vary in different schools, and depend much upon methods of training. Information concerning classes 3, 4, has been presented to division of Demography.

Certain groups of children are best defined by the association of two or more physical conditions.

(5.) Cases presenting defect in development and abnormal nerve signs.—Boys, 1,975; girls, 1,096; total, 3,071. Such children are usually dull at work, and are often at low nutrition.

(6.) Cases presenting defect in development and abnormal nerve signs, also indications of low nutrition.—Boys, 412; girls, 381; total, 793.

(7.) Eye cases.—Obvious defects, such as

squint or disease were recorded, but no tests were applied to detect errors of vision or refraction. Ophthalmia was seen in certain day schools, but these cases were not recorded.

(8.) Deaf or partially deaf.—Boys, 34; girls, 33; total, 67. Tests for hearing were not generally used, but when a child was found deaf it was noted.

(9.) Cases crippled, deformed, or maimed.—Boys, 157; girls, 84; total, 341. These children varied greatly. Many were partially incapacitated for life, others only temporarily, some are mentally dull, others bright; they also differ greatly in physical health and strength.

(10.) Epileptic.—Boys, 32; girls, 23; total, 54. These cases were asked for in every school. Any case with a history of epilepsy or fits was recorded for what it was worth. It would appear that most epileptic children are frequently absent from school.

(11.) Cases selected as exceptional in mental status.—This group includes cases when the results of observation coincided with the teacher's opinion as to mental defect; it includes many imbeciles, obvious brain defects and disease, while less serious cases are also given. It is difficult to define what physical conditions alone indicate the child as unfit for average training, and I think an arbitrary attempt to do so must fail. Speaking generally, I would suggest that classes 5 and 6 need special attention in school, and should be known to the managers.

(12.) Children delicate, pale, or thin (low nutrition).—This condition shows a high degree of correlation, with defects in development and nerve signs, also with mental dulness. No inquiries were made in day schools as to the feeding of the children. The 2,003 children, with low nutrition, presenting the following co-existing conditions: Defects in development, 1,459; abnormal nerve signs, 1,233; defects in development and abnormal nerve-signs, 793; dull in school, 797.

The study of children in school.—The general outcome of this work indicates the advisability

of studying the pupils in two ways: (1) by mental tests, and (2) by physical examination or inspection. For the gain of direct scientific knowledge it is desirable to note all departures from the normal types. It appears to be a great gain to note, not only points in development and physiognomy, but also the nerve-signs indicated; those postures or balances and movements, or actions which were noted as signs were selected after much labour in observation, analysis, and comparison, and they seem well suited for the purpose in hand. They are readily recognised, and can easily be taught by means of casts, diagrams, and demonstration.

Physical examination by inspection is useful (1) as a means of selecting cases for special mental report, (2) as supporting a report founded on mental tests only. The double mode of inquiry is specially necessary to detect certain cases; the mental test alone would leave out of view those nervous children who suffer much, but are usually bright at work and interested in it, and tend to pass the standards quickly; on the other hand, grave mental defects may occur with brains good for all other functions.

As a hospital physician, one sees many children—delicate, feeble-brained children with small heads, nervous children with headaches, chorea, occasional fits, those partially deaf and blind, conditions without a tendency to a fatal termination, and not preventing a modified and adapted education. Such children need provision for their training; without it they will probably tend to failure and incapacity in after life. They should be known and specially cared for.

#### THE DISTINCTIONS BETWEEN HEALTH AND DISEASE.

*(From a quaint old book written by Dr. Maynwaringe, "On the Method and Means of Health," published in 1683.)*

You that have health and know not how to prize it, I'll tell you what it is, that you may

love it better, put a higher value upon it, and endeavour to preserve it with a more serious and stricter observance.

Health is that which maketh your meat and drink both savoury and pleasant, else Nature's injunction of eating and drinking would be a hard task and a slavish custom.

Health is that which maketh your bed easy and your sleep refreshing; that reviveth your strength with the rising sun, and maketh you cheerful at the light of another day; 'tis that which filleth up the hollow and uneven parts of your carcase, and maketh your body plump and comely; 'tis that which dresseth you in Nature's richest attire, and adorns your face with her choicest colours.

'Tis that which maketh exercise a sport, and walking abroad the enjoyment of your liberty.

'Tis that which maketh fertile and increaseth the natural endowments of your mind and preserveth them long from decay, maketh your wit acute, and your memory retentive.

'Tis that which supporteth the fragility of a corruptible body, and preserveth the verdure, vigour, and beauty of youth.

'Tis that which maketh the soul to take a delight in her mansion, sporting herself at the easement of your eyes.

'Tis that which maketh pleasure to be pleasure and delights delightful without which you can solace yourself in nothing of earthly felicities or enjoyments.

But now take a view of yourself when health has turned her back upon you and deserted your company; see how the scene is changed, how you are robbed and spoiled of all your comforts and enjoyments.

Sleep that was stretched out from evening to the bright fair day is now broken into pieces and subdivided, not worth the accounting; the night that before seemed short is now too long, and the downy bed presseth hard against the bones.

Exercise now is toiling, and walking abroad is the carrying of a burden.

The eye that flashed like lightning is now like the opaque body of a thick cloud, that, having rolled from east to west swifter than a celestial orb, is now tired and weary with standing still and that hath become obtuse and dull.

If this, then, is a true picture of the opposite conditions of health and disease, what stronger inducements can anyone require to give him an interest in the study and observation of Nature's institutions, seeing that they are the only means by which the beloved ends and wished-for enjoyments can be attained, and that we may as likely keep or acquire riches by prodigality as preserve health and long life by intemperance, inordinate passions, a noxious air, and such like injurious customs, ways, and manner of living.

## Reviews and Notices of Books.

*Denmark: Its Medical Organisation, Hygiene, and Demography.* Pp. 474. Copenhagen: J. GJELLERUP. 1891.

THIS interesting and instructive book, which bears upon its cover the words, "Presented to the Seventh International Congress of Hygiene and Demography," does credit alike to the Danish Government, at whose expense it was printed and published, and to the fifty or more chiefs of departments, medical men, and others who took part in its production. The editorial committee comprised Dr. J. Lehmann, dean of the Royal Board of Health, Dr. J. Carlsen, and Dr. A. Ulrik, medical officer of health, Copenhagen. In order that the work might be presented in the English language, Drs. H. Mygind, S. D. Jacobson, and E. Schmiegelow, all of Copenhagen, undertook the arduous task of translating the numerous contributions which it contains. They have performed the duty with much ability.

In 1876, a series of disconnected articles,

bearing upon hygienic subjects, translated into French and brought out at the expense of the State and the Copenhagen Municipality, was presented to the Second International Congress of Hygiene, held in that year at Brussels. Fifteen years having elapsed since the Brussels Congress it was rightly deemed desirable to present a description of the present position of hygiene and demography in Denmark to the recent Congress held in London; and, as in the case of the Brussels Congress, the value of the work was enhanced by translating the contents into English, as being the language of the country in which the Seventh Congress was held. The Danish Government readily undertook all expenses of production.

Medical Organisation is dealt with in the first portion, Hygiene occupies the second and by far the lengthiest part of the book, while Demography, including vital and mortality statistics, is fully discussed in the remainder of the work.

From one of the articles on sanitary matters we learn that Copenhagen and twenty-five provincial towns of Denmark have each a central water supply, principally from deep wells or Artesian borings. It may be mentioned in connection with this subject, that, since the year 1860, when the water supply of the Danish metropolis was greatly improved by Artesian borings in the neighbourhood of the Sønder lake, thus insuring a good supply from the chalk bed, the mortality from typhoid fever has considerably decreased; the supply is constant and ample. As regards drainage, Copenhagen and fourteen out of sixty-seven provincial towns have a complete system of sewers; twenty-five of the provincial towns are partly provided with sewers; the remaining towns depending, in great measure, on open drains for the removal of their sewage. In this, as in other respects, great sanitary improvements are under contemplation, and will soon be effected. A government which works so energetically in conjunction with

its sanitarians cannot fail to make hygienic progress.

We should not omit to mention that numerous maps, diagrams, and other illustrations add materially to the completeness of this book.

*Rivista Internazionale d'Igiene.* Napoli. 1891.

EACH succeeding number of this monthly periodical, published at Naples, and edited by Professor Eugenio Fazio, lecturer on hygiene at the University of that city, affords satisfactory proof of the advancement of sanitary science amongst our Italian fellow-hygienists. The more recent numbers contain much interesting and useful information, from the pens of the editor and his able staff, concerning biology, bacteriology, sanitary legislation, engineering, and chemistry in relation to sanitation, statistics, and other matters pertaining to hygiene.

*Revue Internationale des Falsifications.* Amsterdam: 146, Spinstraat. 1891.

ALTHOUGH printed in the French language, this international publication is brought out at the capital of Holland, under the editorship of a Dutch writer of repute, Dr. P. F. van Hamel Roos. It is now in its fifth year of publication.

As the official organ of the International Association for the suppression of adulteration in all kinds of provisions and unmanufactured goods, it deals with adulterations as noted in all European countries, every one of which is represented in the lengthy list of contributors.

Thus, under the head of "Adulterations observed in France," particulars are given of the results of the analysis of samples of adulterated beer, pepper, and cattle foods.

Drs. Coster and Mazure, government officers appointed to examine articles of food at Amsterdam, give a report of a year's work in their laboratory. The number of samples analysed amounted to 3,949; the principal being flour, breads and confectionery, bonbons, coffee, tea,

spices, oils, and alcoholic and other beverages. It is gratifying to find such a small proportion of adulteration as that certified to by the Dutch official analyst. We notice one singular substance referred to in the section upon coffee and its substitutes, styled by the manufacturers "Health Coffee" (*Café de Santé*.) This fraudulent article does not contain any coffee, its actual components being roasted rice grains, ground up and mixed with a small quantity of chicory, presumably to flavour it, and thus further mislead the dupes who might buy at a high price such worthless rubbish as "Health Coffee." Numerous specimens of tea were examined without detecting the admixture of other kinds of leaves, or of any adulterant, although the analysts specially directed their attention to the cheaper sorts of tea, sold as tea-dust, &c.

Dr. Hamel Roos, the editor of the *International Review of Adulteration*, gives the following curious anecdote of the detection, by the aid of the microscope, of an attempted fraud. A merchant sold some goods to be paid for at the expiration of thirty days from the date of delivery, confirming the arrangement by letter. When the thirty days had run out, he applied for payment of the amount due to him, and was told by the debtor that ninety, and not thirty, days were the agreed term of credit; in support of this assertion, the debtor produced the vendor's letter, where the figures "90" appeared plainly enough. Not satisfied with this, however, the merchant took steps to have the letter examined under a microscope. This examination clearly demonstrated that the figure "3" had been enlarged into "9" with the same ink as had been used by the debtor in writing a memorandum at the foot of the letter, such ink differing in various respects from that which had been employed in writing the letter. The attempted fraud was so evident that the debtor hastily paid the debt without further parley.

### DIETETIC NOTICES.

THE STANDARD MALT EXTRACT is an excellent preparation, possessing valuable nutritive and digestive properties, through the diastase which it contains. According to published analyses it is not only pure, but it has three times the strength of any other extract, although it is lower in price. The Standard Malt Extract Company, whose works are situated at Mistley, in Essex, rightly make a point of the fact that their Extract is exclusively prepared from the best quality of English malt, while the bulk of similar extracts hitherto sold in this country are of foreign origin. Another speciality of the Standard Company is a combination of their Malt Extract with Cod Liver Oil, the latter being rendered free from disagreeable flavour and odour.

### Notes and News.

THE MANCHESTER SHIP CANAL AND THE IRWELL WATER.—A member of the Salford Town Council has uttered a timely note of warning, both in the Council and in letters published in the *Manchester Guardian*, concerning the danger to health that must arise if the Irwell water is permitted, in its present polluted state, to pass into the ship canal and docks. The prospect of impounding, in the midst of a dense population, 114 acres of a mixture, one-half of which is liquid sewage, is one which should set the inhabitants of Manchester to work in earnest to obviate the possible evil. Mr. Phillips writes:—"There being no hope of sufficient purification at the sources of pollution up the stream, the only practicable remedy is to treat the river water, before it enters Manchester and Salford, by running it bodily through a filtering or purifying process. Establish the necessary works outside the town, where the solid matter can be disposed of, deviate the stream in times of ordinary flow for treatment, leaving the river bed open to carry flood water, which from its bulk could not be treated. As floods happen rarely they might be allowed to pass. I would seek powers to charge the cost of this treatment upon all local authorities, works, mills, &c., which pollute the stream, in proportion to their ratable value." Independently of the question of the Ship Canal, it is high time that the inhabitants of the two great towns particularly concerned, should devise means for getting rid of what has for many years been a standing danger and disgrace to both; once, doubtless, a clear stream, but now, and for a long period past, in such a filthy

condition that the following verses, in imitation of a well-known poem, scarcely suffice for its description:—

"I flow by tainted, noisome spots,  
A dark and deadly river;  
Foul gases my forget-me-nots,  
Which haunt the air for ever.  
I grow, I glide, I slip, I slide,  
I mock your poor endeavour;  
For men may write, and men may talk,  
But I reek on for ever.  
  
I reek with all my might and main,  
Of plague and death the brewer;  
With here and there a nasty drain,  
And here and there a sewer.  
By fetid bank, impure and rank,  
I swirl, a loathsome river;  
My breath is strong, though I am weak;  
Death flows on me for ever."

There is nothing in Mr. Phillips' suggestions which engineering skill would be unable to carry out; while, as regards the purification of the water, this is a case for which Scruby's process, described in the August number of HYGIENE, would be admirably suited.

MAIZE, or Indian corn, although largely used for food in the United States, has found little favour elsewhere. It is somewhat poorer than wheat in flesh-formers, but it contains more fat than the latter grain, or barley. When it is mixed with wheaten flour, it furnishes the material for good, wholesome bread. In order to demonstrate its value as a bread-stuff and in making porridge, puddings, cakes, and biscuits, a "Corn Restaurant" will be one of the novelties for European visitors to the World's Fair at Chicago next year. Until the potato famine in Ireland, some forty-five years ago, maize was scarcely known in Great Britain. Our countrymen are, unfortunately, most conservative with respect to the adoption of new articles of food; and another circumstance which has probably told against its rapid introduction, is the relative cheapness of Indian corn, which has led to its more extensive use for feeding horses, cattle, &c., than for human beings. If imported into Russia, as we hope it will be in large quantities, in view of the fearful famine prospects in that country, an immense amount of good must result, in addition to the United States farmers finding a ready market for their maize.

PURE SPRING WATER FOR LONDON.—A large and influential party of gentlemen interested in this important subject, visited Mr. Webster's pumping stations at Rickmansworth and Springwell on the 10th of October. It will be remembered that a similar gathering was held in August, during the meeting of the Seventh International Congress of Hygiene in London, and that many eminent sanitarians took that opportunity of judging for themselves the measure of success which has attended Mr. Webster's experimental wells and borings. A full description will be found in the September number of HYGIENE; so that it will

suffice to mention here that the present daily output is estimated at 10,000,000 and that this quantity could be readily doubled without any great outlay; while the supply of pure spring water from this and other chalk-beds in the vicinity of the metropolis is practically inexhaustible. Notwithstanding the unfavourable condition of the weather for outdoor demonstrations, the special train from Euston Station was well filled. Amongst the visitors were Sir Spencer Wells, Bart., Sir Guyer Hunter, M.P., Mr. A. C. Morton, M.P., Mr. Haggis, deputy-chairman, L.C.C., Dr. Richardson, F.R.S., Mr. Jabez Hogg, Dr. Abbotts, Surgeon-Major Cuffe, Mr. W. Whiteley, Dr. Cooney, Dr. Hill, Mr. Monckton, C.E., with many other county councillors, and members of the medical, engineering, and literary professions. About 100 guests were entertained subsequently at Harefield Grove (Mr. Webster's country residence), and from the conversation during luncheon, and the various speeches made afterwards, it was evident that they were favourably impressed, indeed, agreeably surprised, by the result of the boring operations conducted by Mr. Webster and his engineer, Mr. Monckton.

A LITTLE KNOWLEDGE IS A DANGEROUS THING, or, at any rate, very misleading. "A contemporary, the *Journal of Education*, gives the following, and original, essay on "Breath," written by a boy who had attended some lectures on physiology:—"Breath is made of air. We breathe with our lungs, our lights, our livers, and our kidneys. If it wasn't for our breath we should die when we slept. Our breath keeps the life agoing through the nose, when we are asleep. Boys that stay in a room all day should not breathe. They should wait till they get outdoors. Boys in a room make carbonic acid. Carbonic acid is more poisonous than mad dogs. A heap of soldiers was in a black hole in India, and carbonic acid got in that black hole and killed nearly every one afore morning. Girls kill the breath with corsets that squeeze the diagram. Girls can't run or holler like boys because their diagram is squeezed too much. If I was a girl, I rather be a boy, so I can run and holler, and have a good big diagram." We wonder, when we read such anecdotes as this, how much of the extraordinary jumble of ideas, is due to the pupil, how much to the teacher.

COTTAGE DWELLINGS IN NORTHAMPTONSHIRE.—Dr. Morris, the medical officer of the Wellingborough rural sanitary authority, has made some extraordinary revelations in a report to the authority. He states amongst shocking cases of overcrowding that a man, wife, and eleven children lived in a house that had only one bedroom. In another case a man, wife, and five children, the eldest sixteen, slept in one room; and in a third case eight people slept in one room. These revelations, however, were mild compared with what the doctor had to say as to the condition of cottage property in the villages of Farnish and Wymington. With regard to these, he said he had read of the condition of the Indian in his wigwam, and of the negroes, but the state of these people was worse than that of the savage or the slave.

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## SPECIAL NOTICE.

WE have much pleasure in announcing that, from and after our next issue, January, 1892, forming the commencement of a new volume, HYGIENE will be enlarged, without any increase in price.

The Annual Subscription will be reduced to 6s., for which HYGIENE will be forwarded, post free, to any address in Great Britain and Ireland, Australia, New Zealand, Canada, the United States, Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Russia, Portugal, Spain, Sweden, Switzerland, Turkey, and other countries included in the Postal Union.

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HYGIENE FOR 1891.—The title-page and index of the volume closing with the present number will be published with the issue for January, 1892.

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## THE EDUCATION, TRAINING, AND STATUS OF SANITARY INSPECTORS.

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By GEO. REID, M.D., D.P.H., Medical Officer, Staffordshire County Council.

THE local sanitary administration of this country is conducted by district authorities or boards, who are appointed by the ratepayers. In extent, the districts, both as regards area and population, vary considerably, and they are classed as urban and rural, the distinction

being dependent broadly on the density of the population.

Recently county councils have been instituted, to whom certain limited sanitary powers have been intrusted, over large areas embracing a number of authorities, and the whole organisation is under a controlling central authority, the Local Government Board.

The district authorities appoint medical officers of health, who are their responsible advisers on matters relating to the health of the people. In addition to these, inspectors of nuisances, or, as by preference they might be called, sanitary inspectors, are appointed, and it is with regard to the education, training, and status of these latter officers that this paper is concerned.

By way of economising time, and for the information of those who may not be familiar with the duties of a sanitary inspector, I would compare them with those of a police officer, substituting disease in one case for crime in the other. A little reflection on these lines will convey an idea of the varied, the responsible, and in many cases the dangerous nature of the calling, and it will at once become apparent that special knowledge, training and experience are indispensable requirements in such an officer. To efficiently discharge his duties it is essential that, intellectually, he should at least be entitled to take an average place, and that, technically, he should possess, at any rate, an

elementary knowledge of the various conditions upon which the hygienic well-being of the community is dependent, including the physical laws that govern all sanitary operations.

An inspector, then, ought to know enough of physics in relation to air and water to enable him to understand the principles upon which proper ventilation, warming, water supply, and drainage are dependent. He ought to be familiar with physiology to an extent that will make intelligible the influence that impure air, impure water, and general insanitary surroundings exercise on the usual healthy functions of the body. The conditions upon which the origin and spread of infectious disease are dependent, and the best means of counteracting these, ought to form a part of his stock of knowledge. As a guardian of the food supply, it is necessary that he should be able to recognise unsound meat, a duty which entails a knowledge of the diseases to which animals are liable, and the signs of these in the carcase, as well as of the evidence of putrefactive changes in food, both animal and vegetable. The operations of certain trade processes that are likely to give rise to nuisances must be known to him, so that he may advise his Authority of cases in which the law that governs these is being abused. And lastly, he must know the provisions—so far as they relate to his duties—of the Public Health and other Acts that govern the sanitary administrations of the country. In short, if the detailed duties of a sanitary inspector mean anything at all, they entail the possession by him of an amount of technical knowledge that, as I have already remarked, can only be acquired by special study and training. To this technical knowledge must be added a good general education that will enable him to properly keep the necessary books and records; and by no means the least important of his requirements are tact and common sense.

It is such a man, and only such a man, who can be of real service as the right hand of the

medical officer of health, whose instructions it is his duty to carry out.

I would here remark that in England, as regards the relationship of the two officers, this is the inspector's recognised position, and, from the nature of his duties, it is difficult to conceive how it could well be otherwise, although in Scotland it would appear to be so. There the two offices have hitherto, theoretically at any rate, been looked upon as distinct and independent, and, only recently, the relative position of the officers has been the subject of considerable discussion in that country, a body of sanitary inspectors having petitioned against the adoption by a county authority of certain by-laws, with the result that the by-laws in question, which sought to establish the same relationship between the medical officer and inspector as is recognised in England, were modified to an extent which, unfortunately, leaves matters much in the same position as before.

One of the arguments used by the petitioning inspectors was, that by reason of the two offices being independent, in the event of the action of the inspector being questioned the medical officer would with greater force be appealed to in his support. This, to my mind, is one of the strongest arguments against the proposition, for, supposing the medical officer's views should differ from those of the inspector, the Authority, in the conflict of opinion, would have to act for themselves. What, too, would be the effect of such independence in large districts under one medical officer but under several inspectors, each differing from the other possibly, in the advice given to the sanitary Authority with regard to similar conditions?

In order to ascertain the present position as regards the details of administration for inspection in the various sanitary districts of England, I recently sent circulars to each inspector in Staffordshire—including those of county boroughs—containing questions with reference to the previous position and training, salaries,

duties, and conditions of appointment in each case. I selected Staffordshire, partly because of my official connection with the county and partly because of the fact that its population is both agricultural and manufacturing. In addition to this, I obtained the same information from a town of upwards of 400,000 inhabitants, which may be taken as an example of most large towns. This information has been condensed into tabular form for convenient reference, but the details are too numerous to admit of more than a cursory analysis in the space at my disposal.

In the first place, with regard to urban districts. In the case of the large town selected as an example, there is a head qualified inspector who receives a salary of £250 a year, and included in his duties is inspection under the Sale of Food and Drugs Act. He has 23 assistant inspectors under him, whose duties are distributed as follows:—Health department, 16; smoke department, 4; dairies, cowsheds, and milk shops, 1; canal boats, 1; and lodging-houses 1. They are not qualified, and they receive from about £70 to £90 a year.

In the four towns with populations exceeding 50,000, in one case the sanitary inspection is in the hands of one man, in two cases there are two inspectors, and in the other the duties, including inspection under the Sale of Food and Drugs Act, are divided among three. The salaries in these cases range from £104 to £140.

In the next group, consisting of five towns with populations of under 50,000 and over 30,000, the conditions, except with regard to assistance, are very much the same.

In the following group, comprised of five towns with populations of between 20,000 and 30,000, while the salaries are about the same, the duties are increased by extraneous work.

Excluding the large towns, then, it may be said that the salaries in towns of under 50,000 and over 20,000 amount to about £2 a week—the wages of a skilled artisan.

Further down in the table, among the

smaller towns, the salaries paid are extremely erratic in amount, and extra duties of a varying nature are imposed. Take, for example, a town with a population approaching 20,000, where the inspector receives £35 a year, as compared with another town, having under 6,000 inhabitants, where the inspector's salary is £80 a year. The contrast is still more marked owing to the fact that in the former case the salary is made up to £95 by the additional appointment of rate collector, while in the latter it is supplemented to £365 in payment for extra work as surveyor, engineer of the water-works, and inspector of a rural district; and as, in this case, the officer has to provide himself with assistants, doubtless the salary paid is not more than the work deserves.

The last example I would call attention to is a district where the inspector is also rate collector, at a joint salary of £35 a year.

In less than one half of the districts only is the tenure of office permanent.

In only nine out of the 39 examples did the inspector possess any knowledge of his duties previous to his appointment, and in only three instances are any definite conditions as to previous knowledge imposed on candidates, although it is but fair to note that in many cases no recent vacancy has occurred, the present officers having held their appointments for many years. In the case of those districts in which appointments have been made within the past five years, out of 17 such (excluding one for which there is no return) only in six did the inspector possess any previous knowledge of his duties.

With regard to the previous occupations of inspectors, they are too varied to enumerate. Policemen, rate collectors, clerks, and farmers form the bulk of them.

In addition to other information obtained, my inquiry included the following question:—“Are you of opinion that you can efficiently discharge your duties as inspector, or, do you consider that your district is too extensive, or,

that other duties (if you have any) occupy too much of your time?" For obvious reasons I have not included in the table the answers given to this question, but I may state that out of 17 replies from towns with over 15,000 inhabitants, 12 inspectors admitted their inability to perform their duties, the reason given, in four instances, being, that the supervision of refuse removal (work which might well be intrusted to an assistant) occupied too much of their time.

That so many negative replies to this question should have been received is not surprising when we find that the range of population intrusted to one man—without the imposition of other duties—varies from above 50,000 to about a quarter of that number, showing, either, that in the one case the work is excessive, or, in the other, too small. So much for urban districts.

With regard to rural districts I have taken area in place of population as a basis for classification. There the salaries paid vary greatly without regard to the size of the districts; also, in a large proportion of cases, other duties, such as those of inspectors of urban districts, rate collectors, school attendance officers, vaccination officers, etc., are combined. In four instances only is this not the case, and, oddly enough, two of these are the smallest districts.

In many cases too, the emoluments from extraneous work form the greater portion of the joint salaries. In the case of three districts, not only is other work allowed, but no limit seems to be placed upon it, the additional occupation in one case being "various," in another that of an architect, and in the third that of a house and estate agent.

In no cases are travelling expenses provided.

In every case the county council grant is taken advantage of.

In one case only which embraces the appointment of surveyor and inspector of an urban district, is any specified previous knowledge required; and again, as in urban districts, the

men selected have usually been policemen, farmers, clerks, &c.

In replying to the question whether the duties can be efficiently performed, no fewer than 10 of the 18 rural inspectors answer in the negative; some calling attention to the fact that other duties occupy too much of their time, although, at the same time, they say that if these were taken away little would be left of the inspector's portion of the salary after paying expenses. To put the matter plainly, the views of the local authorities may be expressed as follows:—"There are certain appointments that must be made involving duties that must be done. Here is an appointment, the duties of which are less defined; let us tack it on to the others to make up one man's salary, and if he has any spare time after doing his regular work, he can devote it to sanitary inspection."

So far as I have been able to ascertain, the sanitary administration for inspection in other countries does not admit of comparison with that in England. In Germany, for example, lay inspectors do not exist—except for the purpose of factory inspection, the general sanitary administration being in the hands of specially qualified medical officers, who are appointed for life by central governing bodies. In addition to the supervision of everything connected with the care of public health, they have other duties to perform, such as public vaccination, medico-legal inquiries, and official visits to schools, prisons, private lunatic asylums, and hospitals.

The details of organisation in one State differ from those in another. The kingdom of Saxony, for example, is divided into 34 "medical districts," varying in extent from 740 to 222,300 acres, and from 9,000 to 350,000 inhabitants. My informant states, that, unfortunately, sanitary inspectors do not exist.

The Archduchy of Hesse, with an area of over 1,800,000 acres (about the size of the West Riding of Yorkshire), and a population of about 1,000,000, is divided into eighteen

sanitary districts, the populations of which vary from 30,000 to about 120,000—the most populous districts being those in which large towns are situated. Each medical officer has, on an average, a population of 55,000 under his charge, and the eighteen medical officers have ten assistants who are not attached to any particular districts. The salaries of the medical officers vary from £120 to £240, and of the assistants from £30 to £50. My informant states that the sanitary administration appears to be satisfactory, although some of the authorities show a want of interest in sanitary questions—a characteristic of which we have a few examples in this country.

The Archduchy of Baden is divided into districts of from 10,000 to 105,000 inhabitants, each district having a medical officer, and, in the case of the large districts, an assistant medical officer. The medical officer receives from £200 to £300 a year. Here the working of the system is said to be "useful, salutary, and satisfactory."

The Kingdom of Wurtemberg is divided into sixty-four districts, with an average population of 31,000. Each district has a Medical Officer of Health, and in addition there are seven "Medical Associates" of the Medical Board, a body part of whose duty it is to visit the various districts periodically. Eight such visits are made every year, so that each district is visited once every eight years. The organization in this case is said to have been satisfactory since the custom of visits by the Medical Board was established.

The sanitary administration of the kingdom of Bavaria, apart from the fact that there are no lay inspectors, would seem to resemble that of this country in that it is divided into eight "Government Districts" corresponding to our counties, each having a "Medical Councillor," and into 152 "Local Districts," with an average population of 30,000, under the supervision of a District Medical Officer. In addition to these officials there is a "Chief Medical Councillor."

The salaries of the District Medical Officers vary from £90 to £140 a year, those of the Government Medical Councillors from £245 to £288, and that of the Chief Medical Councillor from £300 to £350—the amounts varying in accordance with length of service. Here the organisation is said to have proved satisfactory on the whole.

In addition to their salaries, Medical Officers of Health throughout Germany receive fees for public vaccination, and although they are not allowed to hold other public appointments they may undertake private practice, but, it is said, that their official duties occupy most of their time.

In France sanitary organisation is at present being considered, and a Bill has been submitted to the Chamber of Deputies by a "Consultative Committee on Hygiene," which is said to provide for a complete sanitary service, founded partly on information furnished by foreign sanitary institutions. At present there are from 10 to 15 districts, and the sanitary officials, each of whom has one assistant, are the Professors of Hygiene in the Schools of Medicine at Paris, Lille, Nancy, Lyons, Bordeaux, and Montpellier. I am told that these officials have only existed since 1887, and that, so far, they have not rendered much service, their functions not being sufficiently well defined. The salaries of the head officials are £240 a year in addition to that which they derive from other public appointments. Each "arrondissement" also has a recognised medical officer whose duties seem to be "to make investigations and draw up reports on epidemics."

To return to England, I think the system of lay inspection, in principle, is an admirable one, but I have said enough to indicate that reform in detail is necessary.

In the first place, it ought to be a condition of appointment that all candidates should furnish evidence, in the shape of a recognised diploma, of having acquired a knowledge of their duties. This diploma, in my opinion,

ought not to be granted unless the candidate can satisfy the examiners that he possesses a practical, in addition to a theoretical, knowledge of these duties, by previously having been either a pupil or an assistant under a qualified inspector or surveyor. I have seen enough to convince me of the worthless nature of book knowledge only, when an attempt is made to put it into practice. Not only should practical knowledge be required as regards all future candidates, but every inducement should be offered for those inspectors at present in office to qualify for the diploma. I am glad to say that I know of one town where this inducement is offered, in the shape of an increase of £13 a year in the inspector's salary on his obtaining the diploma.

The question will no doubt arise as to who shall be recognised as the qualifying body, but this is a detail which at present need not be considered, although it may well be supposed that the claims of the Sanitary Institute of Great Britain, by reason of the excellent work it has done in this direction during the past thirteen years, ought to receive due recognition.

As regards salaries, if we impose conditions that necessitate a considerable amount of time, and consequently money being spent in acquiring the knowledge to fit men for the work, and this, too, in the face of the possibility that they may not be successful in the after-competition for an inspector's post, it stands to reason that a reasonable inducement should be offered in return.

For the same reason greater security of tenure of office must be guaranteed. Without this security the inspector is practically at the mercy of a body of men, many of whom are directly interested in property which he may consider it his duty to condemn; to be firm and consistent in the discharge of his duties under these circumstances is more than can be expected of human nature. An inspector ought to retain his appointment so long as he efficiently discharges his duties, and, in order that

this security may be guaranteed, his dismissal ought, in all cases, to require the sanction of a controlling and independent body.

In rural districts it is unreasonable to expect the inspector to pay his travelling expenses out of the miserable pittance that is usually paid to him, and yet, without exception, in the districts embraced in my inquiry this is the case. He ought not to be called upon to spend the greater portion, if not the whole, of his salary—which he must do if he does his work—in providing a conveyance to enable him to cover the ground.

The districts, too, under the supervision of one inspector, as regards area in some cases and population in others, are much larger than he can possibly undertake. This fault can be rectified by providing him with assistance, but, in other cases, the districts are too small to support a properly qualified and well paid official. This also is capable of adjustment, although at present I must not attempt to indicate by what means. I would merely throw out the suggestion that the appointment of Registrars of Births and Deaths in the smaller districts, which at present are almost exclusively held by shopkeepers and others whose occupations are in no way allied to such duties, might more reasonably be held by inspectors under the control of medical officers, and thus serve the purpose of amplifying their incomes from a more appropriate source than is usual at present. Moreover, the inspection of dairies and cowsheds and canal boats, which is so frequently entrusted to police officers and others quite unfitted for the duties, ought, in all cases, to be in the hands of sanitary inspectors.

I would now simply add, by way of emphasizing what I have already said, that, having recently had many opportunities of judging of the work done by sanitary inspectors in various districts, the necessity which I had previously felt to exist for radical reform in that department of sanitary administration has been amply confirmed. The undoubted evidence of good

work, in districts in which the inspector proves to be a man who takes an intelligent interest in his work, and exerts himself to acquire a knowledge of his duties—and this, too, in the face of little encouragement from those in authority for whose approval he certainly is entitled to look—testifies to the good that must necessarily follow wise reform. If the inspectors with whom I have come in contact in Staffordshire may be taken as a type of those of other counties, I believe that any effort in the direction of increasing their facilities for becoming more efficient officers, will receive at their hands most cordial support. In proof of this I may mention that, as the outcome of a course of lectures, given by myself in the first instance, and a second course, given under the auspices of the Sanitary Institute, in which I had the kind assistance of various specialists, no fewer than 25 out of 50 inspectors in the administrative county have entered for an examination, with the view of obtaining the diploma of the Sanitary Institute.

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**THE PUBLIC HEALTH (LONDON) ACT,  
1891.**

THIS Act of Parliament (54 and 55 Vict. c. 76), of great importance as regards the metropolis, was passed in August last, and will come into force on January 1st, 1892. Its object is the consolidation and amendment of the laws relating to public health in London, and the extent to which this work has been carried out may be judged when we mention that by it no fewer than seventeen previously existing Acts are wholly repealed, while some twenty others are partly repealed. It consists of 144 sections and 4 schedules.

Section 1 defines the duty of every sanitary authority to cause inspection of their district to be made from time to time, with a view to ascertain what nuisances exist calling for abatement under the powers of this Act, and to enforce the provisions of the Act for the purpose of abating

the same, and otherwise to put in force the powers vested in them relating to public health and local government, so as to secure the proper sanitary condition of all premises within their district.

Sections 2 to 15 relate to general nuisances, such as premises in such a state as to be dangerous to health, ditches, water-courses, closets, drains, ash pits, etc., which constitute nuisances, animals so kept as to be injurious to health, noxious accumulations of refuse, overcrowding, defective water fittings, and any factories or workshops, not being factories subject to the provisions of the Factory and Workshop Act, 1878, which, by reason of uncleanliness, bad ventilation, or overcrowding, have become injurious or dangerous to the health of the persons employed. All of these nuisances are liable to be dealt with summarily under this Act.

Section 16 requires every sanitary authority and the county council to make by-laws for cleansing the streets and the prevention of nuisances; section 17 relates to the penalty for keeping pigs in unfit places; and section 18 gives power for a petty sessional court to prohibit the keeping of any animals in places unsuited for that purpose.

Under sections 19 to 22, regulations are enacted for the prohibition and establishment of certain offensive businesses, namely, blood, bone, or soap boilers, tallow melters, fellmongers, horse slaughterers, manure manufacturers, or any other business which the county council may declare, by order confirmed by the Local Government Board, to be of an offensive character. As it is possible for even sanitary authorities to create a nuisance by the method adopted by them for dealing with or disposing of refuse, it is specially provided by section 22 that the removal and disposal of street and house refuse by them shall be deemed to be a business, and that, in the event of any complaint, proceedings against any sanitary authority for creating a nuisance may be

made or taken by the county council in like manner as if the council were a sanitary authority.

Smoke consumption is dealt with, under sections 23 and 24, so far as regards furnaces and fire-places used for manufacturing purposes and steamers on the river Thames. Unfortunately chimneys are specially exempted by a subsection which brings "any chimney (not being the chimney of a private dwelling-house) sending forth black smoke in such quantities as to be a nuisance" under the provisions of this Act. The metropolis, except in some few localities, mostly on the banks of the Thames or in the suburbs, has relatively few manufactories of any great size, and it is now generally admitted that the dense pall of smoke which hangs over London, and contributes largely to the formation of the gloomy, unhealthy fogs prevalent at this season of the year, is due to the enormous number of private chimneys. The probable explanation of their being exempt from the provisions of such an important Act as the one under notice is that the persons by whom it was framed thought that it would be an injustice to penalise offences apparently not of a preventable nature. Within the past half-year, however, the question of smoke abatement, as regards private houses, has been brought within the range of practical solution, and it is now a fact that any householder can, at the expense of a few shillings per grate, prevent the smoke of his chimneys from polluting the air. We refer here to the smoke filter invented and patented by Professor Lobley.\*

Sections 25, 26, 27, and 28 relate to regulations for insuring the cleanliness, ventilation, and other sanitary conditions of workshops, bakehouses, and dairies.

The duty of every sanitary authority to keep the streets of its district, including the foot-paths, properly swept and cleansed, and to

collect and remove all street refuse and house-refuse, is well defined in sections 29 to 36. Two matters of some importance to the metropolitan householder may be mentioned here: firstly, that so much of any Act as requires the occupier or owner of any premises in London to cause the footways adjoining his premises to be swept and cleansed is repealed by the present Act, such duty now devolving upon the local sanitary authority; secondly, that the householder will be no longer subjected to the caprice and blackmailing of the scavengers and dustmen, for sub-section 3 of section 30 says as follows:—"If any person in the employ of the sanitary authority, or of any contractor with the sanitary authority, demands from an occupier or his servant any fee or gratuity for removing any house refuse from any premises, he shall be liable to a fine not exceeding twenty shillings."

Regulations as to the obligations to provide proper closets when building houses, sanitary conveniences for workshops and factories, public lavatories, and to cleanse and cover offensive drains or ditches, are contained in sections 37 to 46.

Section 47 deals at considerable length with the inspection of premises where food is prepared, kept, or exposed for sale, the destruction of unsound meat, etc., and the punishment of persons having in their possession unsound food intended for sale; the person to whom the food belongs, or by whom it has been deposited for sale, is equally liable with the actual seller to a fine not exceeding £50 for every animal or article, or if the article consists of fruit, vegetables, corn, flour, or bread, for every parcel thereof condemned by the court; at the discretion of the court the offender is liable to imprisonment for a period not exceeding six months, with or without hard labour.

Provision as to house water supply, public wells or fountains, and the closing of polluted wells, is made in sections 48 to 54.

Sections 55 to 74 regulate the notification

\* One of these valuable apparatus can be seen in daily operation at the offices of HYGIENE, 39, Southampton Street, Strand, W.C.

and prevention of infectious diseases; powers are given to sanitary authorities, under sections 75 to 87, for providing hospitals and ambulances for persons suffering from infectious diseases, and for adopting such other measures as may be deemed by the sanitary authority expedient for the prevention of epidemic diseases.

In accordance with sections 88 to 93, it is the duty of every sanitary authority to provide mortuaries, in addition to which the county council is authorised to fit up one or two suitable buildings in London to which dead bodies, not identified, may be conveyed, with clothing and other articles belonging to the deceased persons, and preserved with a view to ultimate identification, somewhat after the Morgue in Paris.

Section 94 gives power to every sanitary authority to make and enforce by-laws as to lodging-houses, such section not applying, however, to lodging-houses coming within the Common Lodging-Houses Act, 1851, or any Act amending the same.

Tents and vans used for human habitation, the promotion of cleanliness in them, and the prevention of nuisances in connection with them, are fully dealt with in section 95; while three very important sections, numbered 96 to 98, are occupied by regulations as to underground rooms used for dwellings.

The remainder of the Act is taken up by sections defining the sanitary authorities under the Act, their powers, and the manner in which the provisions of the Act shall be carried out.

Altogether, the Public Health (London) Act may be regarded as a very useful measure, consolidating, as it does, much previous legislation, hitherto scattered through numerous other Acts, more clearly defining the duties of sanitary authorities, and embodying more stringent provisions than those contained in previously existing statutes for the sanitary government of the metropolis.

## PATENT MEDICINES.—No. 9.

### MATTEI'S ELECTRO-HOMOEOPATHIC REMEDIES; SEIGEL'S SYRUP.

In the April issue of the *Review of Reviews* the editor of that periodical stated that it had been decided (without informing his readers by whom), that a small committee, consisting of himself (Mr. Stead), Sir Morell Mackenzie, and Dr. W. G. Potter, with the occasional assistance of Dr. Lawson Tait, of Birmingham, would suffice to see that the Mattei remedies were fairly put to a practical test on a number of cancer patients in an experimental ward at St. Saviour's Hospital, a small institution situated in Osnaburgh Street, N.W., and under the superintendence of Mrs. Palmer, a warm supporter of Mattei. We ventured at the time to point out that, having regard to all the circumstances, such a test would scarcely be regarded as satisfactory, either by the medical profession or by the public. Our reasons will be found in the June number of HYGIENE. But, at any rate, we thought that the enquiry, such as it was to be, would be completed within a reasonable period. We are rapidly approaching the end of the year, however, and all that has been vouchsafed by way of intelligence on the matter is contained in a paragraph which appeared in the *Review of Reviews* for November 15th:—

“THE EXPERIMENTAL TEST OF THE MATTEI MEDICINE.—Correspondents frequently write to ask me why I do not publish reports of the progress of the experimental test to which certain cancer cases have been subjected under the supervision of a small committee. The reason is simple. The cases being under the committee, I am precluded from reporting on them while the matter is, as it were, *sub judice*. The committee will report when the experiment has made sufficient progress to enable them to express a definite opinion, one way or the other. Till then they will preserve silence. The experiment is being steadily carried on and that is all that at present I am permitted to say. Those who wish to know more about the question will be glad to learn that Dr. Samuel Kennedy has just put through the press a shilling volume entitled ‘Is Cancer Curable?’ The Cancer Controversy, Mattei *versus* the Knife; how it began and how it ended, with an epitomised guide to the Mattei treatment of cancer and general diseases.”

It is difficult to conceive a more "simple" reason for withholding information, or a more apparent puff of Mr. Kennedy's shilling volume, which is also announced in bold type in the advertising columns of the *Review of Reviews*. Besides this advertisement, several more relating to the Mattei "marvellous remedies" are contained within the covers of the November number.

As one of the three committee-men, Mr. Stead would have acted with the discretion that might reasonably be expected of him had he shown himself less of a partisan. A curious instance of Mr. Stead's bias in this respect may be referred to as concerning ourselves. In the *Review of Reviews* for June, and in previous issues, HYGIENE was included in the list of magazines, and, in fact, two notable articles published in the May number of our periodical were specially mentioned. But our June issue contained some criticisms and comments upon the Mattei medicines, and HYGIENE has not been quoted since—indeed, it has been carefully eliminated from the magazine list. Yet, during the last six months, we have not been aware of any falling off in the character of the contents of HYGIENE, in which during that period have appeared contributions from the pens of such eminent practical sanitarians as the Earl of Meath, Sir Henry Roscoe, M.P., F.R.S., Sir Douglas Galton, K.C.B., F.R.S., Sir Joseph Fayrer, K.C.S.I., Sir Henry Thompson, Sir Philip Magnus, and Professor Frankland. But some of our contributors happen to be qualified medical men, and Mr. Stead's enthusiasm for quacks and quackery prevents him from often having a good word to say for doctors, "who in almost every age have committed themselves to blunders which have made them the laughing-stock of their own profession in the next generation" (*Review of Reviews*, Sept. 15th, 1891). This extraordinary attack forms part of a paragraph concerning the Congress of Hygiene in the previous month, August.

The number of cancer cases under treatment with Mattei's remedies seem to be almost as few as that of the select committee-men, if we may rely upon the scanty particulars which are allowed to ooze out from time to time. We say, "if we may rely," because in the number of the *Review of Reviews* for June, Mr. Stead made a statement upon this point which he proceeded to contradict in the next month's issue. Surely, so important a member of the experimental committee ought to have known whether the number of cases under observation was three or five.

MOTHER SEIGEL'S SYRUP.—It is about time that Mr. Stead should take this old dame under his special protection; at any rate, she is as respectable and wonderful (in advertisements) as Mattei or Sequah. Our attention having been recently drawn to a more than usually gushing account of Mother Seigel's Syrup, published in the advertising columns of a monthly contemporary, and describing the sad troubles of a Mrs. Sarah Davis, prior to her being induced to try Seigel's Syrup, from a combination of ailments from which she had suffered ever since she was fourteen years of age, we were so deeply interested in her case that we asked a lady to write to her for additional information. Poor Mrs. Sarah Davis! "She was under the treatment of physicians virtually all her life," says her chronicler. "Medicines in great variety were prescribed and used. Yet the strongholds of her malady were never overthrown. All her days were not alike dark, but none were clear. Thus life went on without dropping into her lap any of its fruits or flowers. What can be more sad than such an existence?" With a stifled sigh, we repeat this terrible question, hoping that some of our readers will answer it. We cannot, perhaps owing to our unpoetical nature, which precludes our taking in thoroughly the idea conveyed by the "fruits or flowers" of life. Moreover, we have no lap for them to drop into; and, unlike Mrs. Sarah Davis, we have never worn an apron except at Masonic gatherings.

Well, as we have just said, eager for more intelligence as to the marvellous curative powers claimed for Seigel's Syrup by the proprietors of that patent medicine, we requested a lady to write to Mrs. Davis, and enquire whether she could recommend it for the treatment of hernia. We felt that if Seigel's Syrup could cure hernia, otherwise rupture, it would successfully cope with every disease that mortal man is heir to. All persons who give testimonials to the proprietors of Seigel's Syrup seem to be diligent correspondents; in our October number we mentioned that one of these persons, a railway guard, received from the proprietors of the Syrup no less than £14, to defray postage expenses, representing, according to our calculation, upwards of 3,000 letters. A letter addressed to Mrs. Sarah Davis, Brown's Hill, near Chalford, Gloucestershire, elicited the following reply by return of post. The orthography is decidedly original, like the advice it contains, but we do not attempt to alter it in any way, lest we might be accused of tampering with the interesting document. The italics are our own.

Novbr. 16th, 1891.  
Brownhill.

DEAR MADAM,—

I received *you* letter and in *answered* to your inquiry I *shoud* advise you to try it.

I am sure it will benefit you in the complaints that you mentioned in your letter if you will give it a *fare* trial.

Yours truly,  
S. DAVIS.

Now, any of Mr. Stead's blundering doctors would, if consulted, have made laughing-stocks of themselves by asserting that powerful purgatives like aloes, the active ingredient of Seigel's Syrup (see analysis published in HYGIENE for October), would mean fearful agony and almost certain death to any patient suffering from rupture of the bowels. But, as James Russell Lowell wrote in one of his Bigelow rhymes, "They didn't know everything down in Judee;" and if the treatment of rupture is one of the things that blundering doctors

don't know, the best resolution they could come to is to act on Mrs. Sarah Davis's recommendation, coroners' juries notwithstanding. Yet there may be some old-fashioned people who believe in educated doctors rather than in Seigels and Davises.

EDITOR.

[The whole of the articles on Patent Medicines published up to the present date will shortly be brought out in a separate form, and at a low price, by Beaumont and Co., HYGIENE Office, 39, Southampton Street, Strand, London under the title of "Patent, alias Quack Medicines."

A new series of articles on patent medicines, with analyses showing their composition, will appear in HYGIENE for 1892, commencing in the January number.]

### THE INSPECTION OF MEAT WITH REGARD TO THE PREVENTION OF DISEASE.

BY FRANCIS VACHER, F.R.C.S., Medical Officer of Health, Birkenhead.

THAT there is no line of separation marking off the diseases of animals from those of man is a truth modern research has forced upon the attention of the medical profession. One can only wonder that such an obvious truth was not clearly recognised long since. The mistake has been that the conditions of health and causes of disease in man have been studied by physicians and medical officers of health, and the conditions of health and causes of disease in the lower animals have been studied by veterinarians. Let it be recognised that both studies are closely related branches of the same subject and will be most profitably pursued together, and very great advances in our present knowledge may be confidently looked for. Our large towns are schools in which the laws of the health of the people are learned, and our large hospitals are schools of human pathology, but comparative pathology, though taught in the veterinary colleges, is not studied as it might be by medical men and veterinarians at every public abattoir. Unfortunately in this country

public abattoirs are not as generally provided as they should be, still in those we have abundance of pathological material is from time to time presented and wasted. If the question be asked—Why is this?—the only answer is that we have, as a nation, no properly organised system of meat inspection. In a few isolated districts some special attention is given to the matter, but there is no general systematic inspection of meat with regard to the prevention of disease, and no facilities are offered for the study of the diseases of animals used for the food of man. Shall I say this is due to divided authority, insufficient powers, and neglect, or inadequate use of powers? Doubtless it is, but the main defect is that the nation has never sufficiently realised the importance of the due inspection of meat used for human food.

As I have again and again pointed out, inspection is often the merest farce; split carcases, dressed and cold, being viewed and passed without the offal or any part of it being produced. Whether a carcase is fit for food is commonly decided by a nuisance inspector or market constable. When the inspection is done by a medical man there is no guarantee that it will be more thorough. Witness question 3479 in the Report of the Glasgow meat case heard in May, 1890 (the Glasgow Local Authority *v.* Hugh Couper and Charles Moore). A health officer and inspector under the Contagious Diseases (Animals) Act, was asked “How many hours in one day do you take to inspect 5400 head of cattle?” “About three or four hours,” is the answer. Private slaughterhouses are allowed almost everywhere, being often the only slaughterhouses in large urban districts, and in these efficient inspection is impossible. Inspection, however perfunctory, it may be said, is better than none. Frequently there is none, for there is little or no check on diseased or dead oxen, or sheep, or swine being dressed in rural districts and brought into towns, uninspected. Finally,

when, notwithstanding the difficulties in the way of inspection, or the carelessness or incompetence of the inspectors, a carcase infected with tuberculosis or anthrax is seized, it has to be taken before a magistrate, and if he refuses to condemn it, it finds its way back into the meat market, and it is open to the owner to bring an action for damages against the person who seized the meat, or the Authority he serves. I have had personal experience that such actions may be brought successfully.

I am aware that owing to provisions in local Acts of Parliament and in special regulations made by local authorities the meat supplies of some districts is subjected to careful inspection, leaving little to be desired. However, this is quite the exception, and the problem presented for solution is how to make it the rule. I have, after much reflection, formed definite opinions as to what is needed. The reforms I propose are far-reaching and will not be easily affected; still, nothing less will accomplish the object sought.

They are as follows:—

1. **THE GENERAL PROVISION OF PUBLIC ABATTOIRS.**—This is the initial step. If sanitary slaughter-houses are to be abolished, better accommodation for the slaughtering of animals used for food must be first provided. Such an abattoir as that erected in my own town in 1887 will, as experience has shown, fairly meet the requirements of a large urban district, and I venture to think that its situation and arrangement may serve as a guide to those who contemplate the erection of such a building. It is situated on a triangular site at the outskirts of Birkenhead, bounded on the N.W. by the main road by which cattle arrive from the country, on the E. by the river, and on the S. by a considerable extent of unoccupied land. The building is of plain style, in brick and terra cotta, and thorough ventilation is secured. At the front are two entrances—one opening to the south avenue, and one to the main avenue. From the south avenue access

is had to three cattle lairages, and two sheep and calf lairages; also a house for suspected meat, a small extra lairage, and office. Passing through any of the lairages one enters a slaughter-house, to which all lead. Beyond this, across a passage, is the cooling-house or dead meat market, the opposite side of which opens on the main avenue. Many hanging runners extend from the slaughter-house to the cooling-house, so that carcases as soon as dressed can be at once passed on into the cooling-house. North of the main avenue are the superintendent's office, a store-room, lavatory, weighing-office, and boiler-house, together with the accommodation provided for the pork-butchers, *i.e.*, a cooling-house, a dressing-house, two killing-pans, an extra boiler-house, and an extensive range of pig lairs. The main avenue communicates with the south avenue by means of the east avenue, and between the east avenue and the river are a dissecting-room, tool-house, gut-dressing-room, drying-room, store-room, latrines, etc. The lairages afford accommodation at the same time for 156 head of cattle, 126 calves, 620 sheep or lambs, and the twelve lairs for swine would afford ample space for 156 full-grown animals.

As under Clause 169 of the Public Health Act, 1875, and allied clauses in similar Acts, "any urban authorities may, if they see fit, provide slaughter houses," all urban districts are fully empowered. If the powers had been compulsory instead of permissive, all urban districts would long since have had public slaughter-houses. The main difficulty is as regards rural districts. Some persons, indeed, think that public slaughter-houses, though useful and necessary in towns, are not required in rural districts. This opinion is probably due to an exaggerated idea of what is meant by a public slaughter-house. It may be but a small place, where the requirements of the district are small. The requisites are accommodation for lairing, killing, dressing, and cooling, and these may be provided in a single building.

having three compartments. All that is essential is that it be quite separated from any other building, that the floor and walls (to the height of six feet) be impermeable, that it be well ventilated, drained, and supplied with pure water, and that it be well lighted, allowing killing and dressing always to be done with closed doors, and that the direct rays of the sun be excluded. A slaughter-house fulfilling these conditions and suitable for a district of 10,000 inhabitants might be erected at a cost not exceeding 6d. or 8d. per head.

What then is wanted? Simply compulsory powers for all sanitary authorities, enabling and requiring them to provide and maintain public abattoirs.

II. THE CLOSING OF PRIVATE SLAUGHTER-HOUSES.—From all parts of the kingdom accounts have been given of private slaughter-houses originally ill-drained or undrained, badly lighted, and ill-ventilated, and suffered to get ruinously out of repair, and foul beyond description. The situation is often close to squalid courts and alleys, in the most densely crowded localities. The resulting effluvia are a constant nuisance to the neighbours, night is made hideous by the bellowing of beasts and the swearing of men, the frightened cattle arriving are a daily source of danger, and little children grow up familiar with scenes of bloodshed. It has been proved beyond doubt that private slaughter-houses do not afford butchers ordinary facilities for cleanly slaughtering, while the efficient inspection of them or the meat prepared in them is impracticable. There are many advantages which would result from the total suppression of private slaughter-houses and replacing them with properly-constructed public ones (the removal of many standing nuisances, the checking of cruelty, etc.), but the main advantage is that by this means only is efficient inspection of meat possible, and some security given that animals intended for food of man will be killed and dressed under wholesome conditions.

Although nominally licences are granted to

private slaughter-houses for one year only, many butchers believe that when once a slaughter-house has obtained a licence it is practically licensed for all time, and no matter how ruinous or filthy it may become, the Local Authority must renew the licence year by year. Though this is certainly not true, legal decisions have been given which show that a Local Authority cannot discontinue the licence or licensed slaughter-house without giving good grounds for so doing. However, that there can be any property in a licence except for the period covered by the licence will scarcely be maintained. If properly-constructed public abattoirs be provided, the tenants of a large proportion of the private slaughter-houses would not ask for a renewal of their licences; and if the terms for the use of the public abattoir were very moderate (as they should be), all butchers would soon see it was to their interest to discontinue the use of confined premises in the rear of their shops, and would let their customers know that their meat was dressed and prepared under full inspection.

**III. THE LICENSING AND REGISTERING OF ALL BUTCHERS AND THEIR PREMISES.**—By the closing of private slaughter-houses, the Local Authority would lose what little control they have over the retail trade, unless some provision be made for the licensing of butchers and their premises. It is generally admitted that the registration of dairies, cowsheds, and milk shops, and the regulations made under the Contagious Diseases (Animals) Acts, 1878 and 1886, and the Dairies, Cowsheds, and Milk Shops Orders have done much to protect milk from contamination. I propose that butchers should be dealt with in a similar manner—*i.e.*, that they be required to register and obtain licenses for their trade premises, and be thus brought under the control of the Sanitary Authority. How this is brought about, provided it be done effectually, is not material. The Local Government Board is the fit central authority to be entrusted with the regulation of

a trade for securing the cleanliness and the prevention of disease. A brief clause in a Government Act would give the Board the necessary power, and then the Board could draw up and issue by-laws for the licensing of butchers and their premises, etc. They might be to the following effect:—

1. Every Local Sanitary Authority shall keep a register of persons carrying on in the district of the authority the trade of a butcher, and of the premises occupied by them for the purposes of their trade; and shall, from time to time, revise and correct the register, and the authority shall from time to time give public notice of a license and registration being required, and the mode of obtaining a licence and of registering. It shall not be lawful for any person to carry on in the district of any Local Sanitary Authority the trade of a butcher unless he be licensed and registered as such therein.

2. It shall not be lawful for any person following the trade of a butcher to occupy as a butcher's shop, or for the purposes of his trade, any premises, whether so occupied at the date of the issue of these by-laws or not, unless and until he first make provision, to the reasonable satisfaction of the Local Sanitary Authority, for the ventilation, drainage, cleansing, and water supply of the same, and for the protection of meat therein against infection and contamination, and until the said premises be licensed and registered by the Local Sanitary Authority.

3. Every person following the trade of a butcher shall keep a daily journal, to be produced at all reasonable times to any officer of the Local Sanitary Authority, in which shall be entered every purchase of meat by the butcher, and the weight thereof, the vendor's name, and a record of all sales.

4. Every Local Authority shall make regulations for prescribing and regulating the cleansing of butchers' shops within the Authority's district, and the fittings, vessels, and implements belonging to the same, and the Authority shall

take steps to insure that the regulations are enforced.

Any person doing anything in contravention of the above must be liable to a penalty, and the maximum penalty would have to be specified.

**IV. THE APPOINTMENT OF COMPETENT INSPECTORS OF MEAT.**—I have just spoken of butchers' shops and their regulations. Though these premises and their contents would of course be subject to inspection, I would have all meat inspected before it reaches the shops and by thoroughly competent inspectors. This should be done at the public abattoir, and the selection of men to discharge such a duty is no simple task. All the qualities required in a perfectly competent inspector of meat it is impossible to find combined in one person, and it follows that in no district should the inspection of meat be entrusted to one person as it often is at present. Connected with every public abattoir there should be a primary inspector or sub-inspector. There is no objection to the superintendent of the abattoir being appointed to this post, provided he is qualified. The best man for the post is, in my opinion, a man brought up as a butcher, who is a fair judge of meat, familiar with the appearances of healthy viscera, and not without some knowledge of the tricks of the trade. To every public abattoir there should also be appointed a veterinary surgeon, who might be entitled "veterinary inspector." He would act in conjunction with the primary inspector, and advise him as to the interpretation of morbid appearances, etc. The veterinary surgeon, appointed under the Contagious Diseases (Animals) Acts in any district, would be probably best suited for this office. Above these officers, and acting in all cases as the chief inspector, must be the medical officer of health. However capable the veterinary inspector and the primary inspector, the responsibility of deciding what shall pass and what shall be seized must always rest with the medical officer of health. The question to be decided on behalf of the public is not one of

pathology. It is not, "Is this tuberculosis generalised or localised?" It is, "Is this meat fit for food of man or not?" This question the medical officer of health answers, after examining the carcase and viscera, and hearing the veterinary inspector and primary inspector. The medical officer of health cannot put this burden on anyone else's shoulders, and he should clearly understand this and qualify himself to give a right answer in all cases. However, this is but one of many duties the medical officer of health is called upon to perform, and however able one cannot expect him necessarily to be a pathological expert and bacteriologist. Every public abattoir requires a further officer—a pathological expert—who would be consulted when necessary, and examine and report on specimens sent to him. The best man for this purpose will ordinarily be the professor of pathology in the nearest medical school. It may seem extraordinary that four regularly appointed officers are required for meat inspection at every public abattoir, but if the work is to be efficiently done none less will suffice. Ordinarily only one of the four would give the whole of his time to the work. The same pathological expert might be appointed for many public abattoirs, just as the same analyst is often appointed for many districts. I pass on now to a subject kindred to the appointment of meat inspectors.

**V. THE GENERAL SYSTEMATIC INSPECTION OF ANIMALS AND MEAT TO BE USED FOR FOOD OF MAN.**—If killing and dressing animals to be used for human food be only allowed at public abattoirs, systematic inspection becomes a comparatively simple matter. The animals would be received at the lairages forming part of the premises at the public abattoir, and their being left there for so many hours previous to slaughter should be required. They would then come under the observation of the veterinary inspector in his daily visits, and any obvious physical signs of disease in the live animal would be noted. As I propose that master butchers should be licensed,

there would be no great hardship in requiring all journeymen butchers and slaughtermen employed at the public abattoir to be licensed. The Sanitary Authority would thus have direct control over them, and secure their obedience to all abattoir regulations. One of the most important regulations would be the keeping of the offal of each carcase separate, and submitting it for inspection with the carcase.

Every animal brought to a public abattoir is, of course, booked, to insure correct returns of slaughter-house dues. If the carcase be found perfectly sound, the entry in this book should be initialled by the veterinary inspector and sub-inspector, signifying that it is so, and may be removed by the owner. If, on the other hand, the carcase be found diseased in any way, the entry in the book should be marked "D," (doubtful), the carcase and offal should be removed to the post-mortem room, or other suitable locked room, and information sent to the Medical Officer of Health. With as little delay as possible this officer should examine the carcase and offal. If he thinks the meat may pass he makes an entry to that effect in his book which gives authority to the person in charge of the abattoir to have it carried back to the cooling-room. If, on the other hand, he is of opinion the meat should be seized, he takes steps for having it submitted to a justice, and applying for an order to destroy it. If there be insufficient evidence as to the nature or extent of the disease, the expert appointed by the Sanitary Authority should be consulted, and portions of the carcase and offal sent to him. The carcase should not be disfigured in any way till the justice has ordered it to be destroyed. If the hearing of an application for an order to destroy the carcase be adjourned the carcase in the interim should be kept in the locked room at the public abattoir. If the adjournment be for several days, the carcase should be kept by the Sanitary Authority in a chilled chamber.

The last matter I have to refer to is:—

#### VI. THE APPOINTMENT OF COMPETENT ASSES-

SORS TO SIT WITH MAGISTRATES AND ASSIST THEM WHEN NECESSARY IN THE HEARING OF CASES RELATING TO DISEASED MEAT.—All the reforms hitherto referred to can be of little avail if, when application is made to a justice for an order to destroy a diseased carcase, the application is refused. The slaughtering of animals may be done in a suitable building under proper supervision, butchers may be licensed, capable inspectors may be appointed, and all meat prepared for food may be carefully inspected, but if the justice refuses to order the destruction of the diseased meat, when discovered and seized, it has to be returned to the owner and is eventually sold to the public. The action taken in the interest of the public has cost time and money, and no one is benefited, the Sanitary Authority is discredited, the consumer is deluded with a sense of false security, and the butcher openly sells meat tainted with anthrax or tuberculosis. It is not the occasional leniency of the bench in dealing with meat cases that is complained of, it is not that bias against the Sanitary Authority is ordinarily manifested ; it is simply that lay magistrates and even stipendiaries are not good judges of such very technical matters as are submitted to their intelligence in most cases. If, when a judge is trying a case dealing with shipping matters, a nautical assessor is allowed him, is it not reasonable to ask that he be allowed a scientific assessor in trying a case when the issues depend on difficult questions of morbid pathology ? Without such assistance the magistrate may be at his wits' end trying to hold the scales of justice evenly in the midst of conflicting scientific testimony, the very language of which is foreign to him. The applicant is embarrassed with enquiries as to what would be the precise effect on the human subject after the ingestion of the meat in question, and ultimately the only way out of the difficulty (scientific witnesses being as plentiful on one side as the other) is for the magistrate to personally examine the meat and judge by the mere

appearances. This is quite as likely to lead the magistrate wrong as right, for meat from a badly diseased animal may look perfectly wholesome. Indeed, if meat were condemned or passed merely on its external appearance no elaborate system of meat inspection would be needed. Any market-constable, or any housewife, is able to judge whether meat be fresh or stale, whether it be young or old, whether it be in good condition or poor condition.

If it be alleged that my proposals are revolutionary, I will not deny it; no slight change will accomplish what is required. My suggestions are at least those of a practical public officer who knows how meat inspection should be conducted and how it is conducted. I am no mere theorist, advising others and doing nothing myself. If any of my readers come to my district, they will see public abattoirs as complete as any I know of, and they will find but two private slaughter-houses; nor of those latter have I any occasion to be ashamed. We have no official butchers' register because we are not empowered to license or register butchers, but they are under regular inspection by a capable inspector. The veterinary surgeon appointed under the Contagious Diseases (Animals) Act co-operates with the primary inspector whose whole time is devoted to meat inspection. All the work is systematically carried out, and carefully supervised by myself. If the interesting pathological material from time to time met with at my Sanitary Authority's abattoir is not utilised as fully as it might be, this is simply due to want of time. That such material has been of immense use to me, and those who act with me at the abattoir in giving us an insight into animal diseases, is undeniable.

**INFLUENZA.**—From several parts of the world, and, coming nearer home, from many localities in our own country, the news reaches us that influenza is alarmingly prevalent. On board the P. and O. steamer *Massilia*, which arrived lately from Australia, nearly the whole of the passengers and crew suffered during the voyage. At one time 96 persons were prostrate with influenza.

## ON THE IMPORTANCE OF DETECTING AND TREATING DEFECTS OF VISION AND HEARING IN THE CHILDREN OF OUR BOARD SCHOOLS.

By ADOLPH BRONNER, M.D., Surgeon to Bradford Eye and Ear Hospital.

IN bringing this subject forward, I do not intend to enter into any long statistics or researches of my own, but would like to treat the subject from a purely practical point of view.

We all know how frequently defects of vision and hearing are met with in children. Cohen, of Breslau, and others have shown that from 16 to 30 per cent. of children have defective vision. Begold, of Munich (*Schuluntersuchungen über das kindliche Gehörorgan*), examined 2,000 children, and found the hearing impaired in 26 per cent.

There is another very common and important affection which is intimately connected with the diseases of the ear. I refer to the so-called post-nasal growths, or swelling of the adenoid tissue at the back of the nose. This prevents the free passage of air through the nose, and the children therefore have to keep the mouth open, and snore at night. The chest cannot develop properly, and becomes narrow and in-drawn. The children in most cases suffer from bronchitis and diseases of the middle ear. Meyer, of Copenhagen, found that from 2 to 7 per cent. of the children whom he examined had post-nasal growths, and that over 80 per cent. of these could not hear well.

These statistics show how very common defects of vision and hearing are in children. How many of these cases are attended to in time? Very few indeed. Even in adults of the educated classes we not unfrequently meet with patients who have not been able to see or hear well for several months or even years, and who have never before sought medical advice. How much more are these cases neglected in the children of the uneducated classes! In these cases it is the duty of the master at school

to interfere and to see that the children are attended to. At present a child who cannot see or hear well, and who therefore does not get on well at school, is simply looked upon as stupid or lazy, and is treated accordingly. Many a brilliant career has been spoilt, and many a child condemned to a life of misery and toil, because some defect of vision or hearing has been neglected. But not only that; we often meet with neglected cases which have become a life-long burden to their relatives or to the community at large. Many cases of neglected discharge from the ear end in inflammation or abscess of the brain, and death.

Neglected cases of post-nasal growths lead to deafness and imperfect development of the mind and body. The teachers of our Board schools are at present perfectly incompetent to deal with these cases. They have no means of testing the vision or hearing of the children; and even if they had, they have no orders or authority to interfere.

What I should suggest is, that certain instructions be given to the teachers, so that they may, in a rough manner at least, be able to judge if a child is defective in sight or in hearing. The case should be reported to the head master, who would then inform the parents of the fact and request them to have the child examined by their family doctor, or, if the people are poor, at some hospital.

All children should be reported whose vision in either eye is less than 6-18, and who cannot read Jaeger II. at from 10 to 15 c.m. Also all children who cannot hear a pocket watch at about 15 or 20 inches; and also those who cannot breathe through the nose, and who consequently keep the mouth open. No child ought to be allowed to attend school if and as long as there is any discharge from the ear or ears.

I am perfectly aware that this proposal is open to many and grave objections, and that it is by no means perfect. Still, I think that it is a step in the right direction, and that it will be of great service to many poor children till

the time comes when we shall have a proper medical supervision of all schools. I trust and hope that this time may not be very far distant

### DIETARY SCALES IN CONNEXION WITH THE HEALTH OF SEAMEN.

By W. SPOONER, L.R.C.P., M.R.C.S., etc.,  
Medical Inspector to the Board of Trade.

THE question of diet is intimately connected with the health of seamen, and I propose in this paper to point out wherein the quantity and description of food usually named in the dietary scales is neither fitted to maintain the general health of sailors, nor adapted to their special calling. I shall more particularly trace the connexion between the food supplied and that disease which used to be, and to some extent still is, the special scourge of the mercantile marine, viz., sea scurvy. There are some diseases which seem to defy the appliances of preventive science, but scurvy is not one of them; it is caused essentially by improper food, and I look upon it as a disgrace, that in this present scientific age, this enlightened nineteenth century, "with all its appliances and means to boot," such an eminently preventable disease should exist at all.

In my capacity as medical inspector to the Board of Trade I have during the last fifteen years held official inquiries into the cause and origin of outbreaks of scurvy, and I have never failed in tracing them directly to the nature of the food supplied. In every report I have made to the Board of Trade I have persistently drawn their attention to the necessity of a radical change in the dietary scale, and in 1883 they requested me to draw out a scale which I considered would be satisfactory. I will allude to this scale presently.

There is a common impression that the food scales signed by the crew at the commencement of their voyage are fixed by the Board of Trade. This, however, is altogether a mistake; it is entirely a matter of contract between the

master and the crew, and the Board of Trade merely see that the scale is inserted in the articles of agreement. Thus these scales possess no higher sanction than that of antiquity. Like that good old eminently respectable disease, gout, they have been handed down from generation to generation, and date from some remote period in ancient history when nothing better could be obtained. The following is a type of this good old-fashioned kind of food which many of our sailors have to put up with even now.

SCALE of PROVISIONS to be allowed and served out to the crew during the voyage.

	Bread.	Beef.	Pork.	Flour.	Peas.	Tea.	Coffee.	Sugar.	Water
	Lb.	Lb.	Lb.	Lb.	Pts.	Oz.	Oz.	Ozs.	Qts
Sunday ...	1	1 $\frac{1}{2}$	—	—	—	—	—	2	3
Monday ...	1	—	1 $\frac{1}{4}$	—	—	—	—	2	3
Tuesday ...	1	1 $\frac{1}{2}$	—	—	—	—	—	2	3
Wednesday	1	—	1 $\frac{1}{4}$	—	—	—	—	2	3
Thursday...	1	1 $\frac{1}{2}$	—	—	—	—	—	2	3
Friday ...	1	—	1 $\frac{1}{4}$	—	—	—	—	2	3
Saturday...	1	1 $\frac{1}{2}$	—	—	—	—	—	2	3

Substitutes at the Master's option.

The above scale is by no means exceptional, but is the one signed for by the crew in the majority of English ships; and, although it might, perhaps, rejoice the soul of Mr. Banting, it cannot be considered of a luxurious nature. It is quite true that on many ships some extras are allowed; thus, very often a fresh mess, composed chiefly of soup bouilli, is given on Sundays in addition; occasionally preserved meat is substituted once a week for salt; sometimes a certain quantity of butter is served out instead of a portion of meat, whilst some extravagant shipowners have even gone the length of giving marmalade and pickles. Such unwonted generosity is, however, by no means universal. In the articles of agreement at the different shipping offices skeleton scales are now kept ready printed at the instance of the Board of Trade, and in these scales are a number of blank columns to be filled up if the ship-owner desires. These columns are headed respectively, soup-bouilli, preserved meat, preserved vegetables, rice, oatmeal, butter, molasses, etc. Until the last few years, however, and even

now very frequently, as far as I have been able to ascertain, these columns remain blank, and the above articles are conspicuous only by their absence.

In considering the above scale of diet, it at once becomes apparent to the scientific inquirer, that it has been constructed with a total disregard to the physiological wants of the system; that in addition to its monotonous character, its excess of salt meat and lack of vegetables, the proportion of the different ingredients is altogether wrong. I will consider these points seriatim.

1st. *The monotony of the diet.*—The human organism is so constituted as to imperatively demand variety. If either fresh beef or fresh mutton, or roast chicken were given every day, the stomach after a time would instinctively revolt and refuse to do its duty; monotony would render it incapable of digestion. Salt beef one day and salt pork the next, given for months in dreary succession, is not very tempting, and not very conducive to healthy nutrition. Strong healthy men will stand this kind of diet for a considerable period, but it is merely a question of time; the weak and feeble and those whose constitutions have been undermined by debauchery ashore, will first go to the wall, and if the voyage be sufficiently prolonged, the strong and healthy will follow in their wake, and an outbreak of scurvy be the result.

2nd. *The excess of salt meat.*—Even if the meat be good in quality, it cannot fail to be injurious if given day after day. The very process of salting has the effect of depriving the meat of some of the soluble constituents, such as the organic acids, the alkaloids, and extractive matters, and renders the residue hard and indigestible; it is also probable that some of the salts of potash are replaced by those of soda. Moreover, highly-salted meat must be thoroughly steeped in water to render it eatable, and by this means still more of the soluble constituents are washed out. It must also be remembered that salt, like charity, may cover a

multitude of sins, and previously unwholesome and unsound meat may have its noxious properties concealed by being salted. I have a vivid recollection of a piece of salt beef of this description ; it looked sound and even smelt tolerably sweet, but after the salt had been partially extracted by soaking and boiling, and it was placed upon the table, it at once became apparent both to the palate and the nostrils that "there was something rotten in the state of Denmark." I should suggest, therefore, that for at least three days in the week preserved meats, either beef or mutton, should be substituted for salted. Preserved meats, weight for weight, are more nutritious than salted, and cost very little more. They can be served in a variety of ways, either eaten cold or made into a hot-pot or sea-pie with a due admixture of fresh or preserved vegetables ; and, in fact, many savoury dishes can be prepared from them, which is impossible with salt junk.

3rd. *Deficiency of vegetable food.*—It has been abundantly proved that the true cause of scurvy is a deficiency of the salts found in fresh vegetables, and there are many cases on record when an outbreak of this disease has been quickly stopped by simply giving a few raw potatoes. It is, therefore, of the utmost importance that a sufficient quantity of fresh potatoes or other vegetables should be put on board the ship to last for at least the first two or three months of a voyage, and whenever there is a possibility of putting into a port these should be replenished. It is to the system of giving plenty of potatoes that the American ships owe their immunity from scurvy—surely what they can do can be done on British ships. Again, there are few foreign ports where fresh vegetables of some kind cannot be procured, but it is unfortunately too often the case that the captain is more anxious to please the owners by an appearance of economy than to preserve the health of the crew, and in the long run, it is often found that the old proverb of "penny wise and pound foolish" is fully illustrated.

In all cases when the fresh vegetables are exhausted, preserved vegetables, either potatoes, carrots, onions, or pickles should be given instead. The law now provides that one ounce of lime-juice shall be given to each man per day, but with a proper supply of vegetable food lime-juice would be unnecessary ; it is at the best but an imperfect substitute, and is not always taken.

4th. *Improper proportion of the different ingredients.*—It is well known that a proper scale of diet should contain a due admixture of the nitrogenous or flesh-forming constituents, comprising vegetable albumen, fibrine, and caseine, and animal flesh and blood ; and of the non-nitrogenous carbonaceous or heat-producing substances, comprising fats, sugar, starch, gum, etc. Numerous experiments have established the fact that the nitrogenous should bear to the non-nitrogenous ingredients about the proportion of one to five. According to Sir Lyon Playfair, a man doing active but not excessive hard work (like sailors) requires daily about 5.5 oz. of flesh-forming food, and 26.3 oz. of carbonaceous, the ratio being as 1 to 4.8. In the scale allowed in the navy, the flesh-formers = 5 oz., and the heat givers 20.4, the ratio being as 1 to 4 ; whilst in the army the flesh-formers = 4.2 oz., and the heat givers 22.06, the ratio being as 1 to 5.2. Now, I have calculated the amount of these ingredients in the ordinary scale of the merchant sailor according to the table of Sir L. Playfair, the fat, sugar, and starch being reduced to one equivalent—viz., that of starch ; and I find it consists of 6.912 oz. of flesh-formers, and 22.416 oz. of heat givers, the former standing to the latter in the proportion of 1 to 3.3.

Thus it appears that the diet of sailors contains a greater amount of nitrogenous food than is required for a man in active labour, greater even than a navvy employed in the very severe work of a railway cutting consumes, and this is owing to the excessive quantity of animal food. In the navy the men are allowed

PROPOSED VICTUALLING SCALE to be served out to the Crew per Day, in addition to the issue of Lime-juice and Sugar required by Law.

	Biscuit.	Flour.	Beef.	Pork.	Preserved Meat.	Preserved Peas.	Preserved Potatoes.	Butter.	Oatmeal.	Rice.	Sugar.	Raisins.	Molasses.	Suet.	Pickles.	Tea.	Coffee.	Oz.
Sunday .....	12	8	-	12	3	8	2	-	-	-	-	-	-	-	-	1	1	1
Monday .....	12	-	1	-	-	2	-	4	-	-	-	-	-	-	1	1	1	1
Tuesday .....	12	8	-	-	12	-	8	-	-	-	-	-	-	-	1	1	1	1
Wednesday .....	12	8	-	12	3	2	-	2	-	4	-	-	-	-	1	1	1	1
Thursday .....	12	-	-	-	12	-	8	-	4	-	-	-	-	-	1	1	1	1
Friday .....	12	8	1	-	-	2	-	2	-	-	-	-	-	-	1	1	1	1
Saturday .....	12	8	-	12	-	3	2	-	-	-	-	-	-	-	1	1	1	1
	lb. oz.	lb. oz.	lb.	lb. oz.	lb. oz.	pt.	oz.	lb. oz.	oz.	oz.	oz.	oz.	oz.	lb.	oz.	oz.	oz.	
One man per week ...	5	4	2	8	2	1	8	2	4	1	8	1	8	6	8	8	8	7
															pt.	oz.	oz.	
															oz.	oz.	oz.	
															1	4	4	
															1	1	1	

## SUBSTITUTES.

Fresh meat to be given instead of salt, and preserved as long as possible after leaving port.

Fresh potatoes, carrots, &c.,  $3\frac{1}{2}$  lb. per week, instead of preserved vegetables, as long as they last.

Oatmeal may be substituted for rice in cold weather, and *vice versa* in hot weather.

Preserved onions may be substituted for preserved carrots.

only 1 lb. of fresh or  $\frac{3}{4}$  lb. of salt meat, and in troopships the daily allowance is  $\frac{3}{4}$  lb. of salt meat for four days in the week, and  $\frac{3}{4}$  lb. of preserved meat the remaining three days. There is no doubt that too much animal food, particularly when there is no severe muscular labour, is injurious to health; it will produce a state of plethora of the system, and cause derangement of the liver, and a predisposition to blood diseases. I am of opinion that 1 lb. of salt meat or  $\frac{3}{4}$  lb. of preserved meat, which is without bone, is ample for all requirements, and the saving thus effected may advantageously be expended on other articles.

Bearing in mind, therefore, the principles I have now enumerated, I drew out a scale for the Board of Trade, which I considered, though by no means perfect, would answer the purpose sufficiently well. I endeavoured to combine physiological correctness with a due amount of economy.

The chief points in which it differs from the old scale are the following:—Preserved meat is substituted for salt meat three days in the week. The quantity of meat altogether is reduced, and potatoes and carrots, either fresh or preserved, butter, oatmeal, rice, marmalade, raisins, molasses, suet, and pickles are added. Preserved meats and vegetables may now be obtained in such perfection that there is no possible reason why they should not be carried; but with regard to the latter, they should only be given when it is impossible to keep fresh ones. Raisins and suet, with an additional quantity of flour, are added, in order that plum pudding may be sometimes given, and oatmeal and molasses form an agreeable change for breakfast. Marmalade has been tried in some ships, and found to answer very well—it renders the hard biscuit more palatable. Pickles go well with salt meat, and are antiscorbutic in their nature. I have calculated the respective quantities of nitrogenous and carbonaceous ingredients in the above scale, and find that it contains 6·144 ozs. of the former, and 29·376 ozs. of the latter, the

ratio being as 1 to 5. I have also estimated the price, and find that it does not exceed 1s. per day, which certainly cannot be considered excessive.

Since the circulation of the paper containing this scale, which, however, the Board of Trade merely recommended, there has been in many instances, especially in Liverpool, a marked improvement in sailors' food, and many firms have adopted a scale more or less allied to it, and some even more liberal. I may mention especially the British Ship Owning Company. That the result has been extremely beneficial the following statistics will show:—

“Outbreaks of Scurvy reported to the Board of Trade during the last 15 years”

Year.	Out-breaks.	Year.	Out-breaks.
1875	58	1883	51
1876	69	1884	27
1877	80	1885	36
1878	84	1886	31
1879	93	1887	40
1880	92	1888	19
1881	99	1889	20
1882	60		

It may be observed that the scale was circulated in 1883, and that since that date the number of outbreaks have been reduced by more than half. These facts speak for themselves. I have no hesitation in saying that, if some such scale (the above errs, perhaps, on the side of economy) were made compulsory, the health of the British mariner would be very much improved, and scurvy would in a short time be totally eradicated and remembered only as a curiosity of the past, a relic of a barbarous and unscientific system of feeding. That this end may shortly be obtained is, in the interests of the seamen and of the shipowners themselves, “a consummation devoutly to be wished.”

COSMETICS are more in favour with the ladies in the United States than with those of our own country. The circumstance that 62,000,000 dollars are annually expended on cosmetics by the American fair ones may, in some measure, account for the average inferiority of their complexions.

## THE RELATIONSHIP BETWEEN THE OCCURRENCE OF DIPHTHERIA AND THE MOVEMENT OF THE SUB-SOIL WATER.\*

By MATTHEW A. ADAMS, F.R.C.S., Medical Officer of Health and Public Analyst, Maidstone.

In the latter part of the year 1884 I commenced a series of observations on the fluctuation of the subsoil water at Maidstone; these have been continued day by day until the present time.

Except for general scientific interest, these observations, in the first instance, had no special point; nevertheless the hope was always entertained that very probably something of a practical value, in course of time, might issue therefrom.

It so befell that after they had been in progress some  $3\frac{1}{2}$  years, namely, at the beginning of 1888, there commenced what in result has proved to be a serious and prolonged epidemic of diphtheria, within the bounds of the Borough of Maidstone, for which Urban Sanitary District I am Medical Officer of Health. The epidemic continued to prevail throughout the whole of the three years 1888-90, previous to which, although there have been occasional cases, so far as my thirteen years' official experience of the Borough of Maidstone goes, diphtheria has never prevailed to any serious extent; in point of fact the total number of cases during the three years 1885-87 were twelve only, against 171 in the three epidemic years 1888-90, so that the six years of our subsoil water records cover two periods, one of comparative freedom from diphtheria, and the other of its epidemic prevalence,—each of three years' duration.

In the earlier stages of the epidemic it did not appear that personal contagion bore any share in the propagation of the disorder; in short, for the space of forty-two weeks the early

cases were entirely sporadic, and distributed as distinctly, and as widely as possible, over various distant parts of the town, without there being, as far as could be ascertained, any connection between one case and another, and it was not until the forty-third and forty-fifth weeks of 1888 that there was any evidence of a tendency for the disease to become localised, this tendency first manifested itself in the extreme West of the Borough. Between the forty-seventh week of 1888 and seventh week of 1889 there was a second localisation in the extreme East of the Borough; and between the eighth and seventeenth week of 1889 a third locality to the North West, but again quite distinct from the two former, became the focus of a third and independent localisation.

The epidemic reached its height between the twenty-third and twenty-fourth weeks of 1889, that is about the seventy-sixth week from its commencement; since then, with sundry pauses, it has continued throughout 1890 into the present year.

The number of cases, deaths, and rates of fatality in a population of 32,000 for each of the three years 1888-90 were as follows:—

Year.	Cases.	Deaths.	Death Rate per cent.
1888	41	12	29.3
1889	58	29	50.0
1890	72	11	15.3
Total..	171	52	30.4

It has been my endeavour all along to collect every useful fact connected with this epidemic; and the purport of the present communication is to bring to the notice of the Congress the results of these observations, chiefly because they appear to show a relationship between the prevalence of diphtheria and certain meteorological occurrences, more particularly those relating to the height and movements of the subsoil water.

On the present occasion, time will not permit of my attempting to go deeply into detail. I

\* A paper read at the International Congress of Hygiene.

must content myself with observing, that the fullest particulars have already been published in my Report upon the Health of Maidstone for 1889, and that my enquiries embraced minute particulars concerning all such matters as it appeared to me were likely to throw any light upon the etiology and mode of propagation of this disorder. They included investigations into the milk and water supplies, school attendance, concurrent diseases among persons and brute animals, the ordinary sanitary conditions of the dwellings and surroundings of the victims, and the various meteorological passing events. In none of these enquiries was anything whatever discovered to incriminate milk or other food supply, nor associated diseases among brute animals, but in almost every primary case, the one fact that stood out clear and distinct, was the existence of some serious sanitary defect, more often than not, connected in one way or other with imperfect drainage; and in several instances the history of the invasion was so circumstantially associated with a specific nuisance that it was impossible to regard the connection at other than cause and effect. Of some of these occurrences I have published detailed accounts in the report already referred to.

Among the impugned conditions, not a few relate to pollution of soil. It being, at the present time, my more especial purpose to invite your attention to, and to concentrate my remarks upon the consideration of an apparent relation between the occurrence of diphtheria and condition of the soil, I will at once pass to a review of certain of the meteorological observations, which I suppose to be active agents in the production and propagation of the disease; these, as already mentioned, were begun in 1884, and have been continued daily until the present time. My plan has been to plot upon one and the same chart all that concerns atmospheric pressure, temperature and moisture; wind and sunshine, rain and subsoil water; general mortality and the time incidence, as well as it

could be fixed, of the commencement of each of the diphtheria cases. \* A diagram which is now before you is an extract from the more extended records, and is designed to bring the whole six years' observations conveniently and collectively under your eye, so far as regards the behaviour of the subsoil water in relation to the occurrence of diphtheria. To accomplish this the daily records have been compressed into weekly periods in order that a comparison of one year with another, and parts of a year with similar parts of other years, may readily be made.

In the diagram the year is divided into quarters, and corresponding therewith beneath each quarter is inscribed the rainfall in inches. The depth of the subsoil water from the surface for any given period can be measured by the scale of feet at one end, and the range of movement of the level of the water during each successive week is indicated by the size of the blue blocks, so that one can see at a glance when and what alterations of level had taken place at any given time, how much or how little change had been and whether rapid or slow.

Accordingly we find as follows:—

	Feet
The maximum depth of water from the surface	17.7
„ minimum „ „ „	15.5
„ Total range „ „ „	2.2
„ average depth „ „ „	16.68

Looking at the diagram as a whole, the first thing that strikes one is a similarity between the curves for the years 1885, 1886 and 1887; this is very obvious, for in each of those years we find a single high tide and a single low tide; the high tide coming at the early part of the year, and the low tide some time about the junction of the third and fourth quarters. Far different, however, are the curves for 1888, 1889, and 1890. In these later years all order seems to be lost, each year presents several high and several low tides, the maximum never being

\* This diagram is not given here, being too large for reduction to the size of a page of HYGIENE.

so high, nor minimum so low, as in the three former years, from which it may be inferred that the soil during the three earlier years was more thoroughly washed during the colder seasons, and better drained, dried, and aërated during the hotter seasons; whilst on the other hand, during the last three years the soil must have been kept in a condition of more or less stagnant saturation.

Moreover it is to be observed that the coincidence of tide and season that prevailed in the earlier years was in great measure reversed in the latter; for example, in the middle of the first quarter of 1888 there came a low tide when we had reason to expect a high tide, and in the middle of the third quarter the highest tide of the year when we might have looked for the lowest; this was followed by nearly 12 months of comparative stagnation, in which the typical features of the winter's washing and summer's aëration of the earlier years were not to be found. With the autumn of 1889 there came, too soon may be, a welcome rise, which gave hope that the annual purge would be accomplished in proper season; but this was not to be, by the end of the year the water had sunk to a level suited to midsummer rather than midwinter, consequently there was total failure of soil-washing during the winter months of 1889-90, and, as time went on, in like manner we were disappointed of the summer's aëration, in place of which there came a most mischievous rise in July. So that the characteristics of the subsoil tide during 1890 were not in accordance with those of the three earlier years, such as we judge to be typical of the more salutary sort.

If now we turn to a consideration of the coincident record of diphtheria, which in similar fashion is exhibited on the diagram by the red blocks, we find a corresponding distinction, equally remarkable, between the three earlier and the three later years: during the former very little diphtheria prevailed, during the latter much.

As long as the single high and low tides, in

suitable agreement with the cold and hot seasons lasted, all went well, diphtheria was scarce; but so soon as this favourable order of things was interrupted, our fortunes changed, diphtheria began to prevail, and as is shown by the diagram, when this correspondence was most exact, as for example in 1887, there was least diphtheria; on the contrary, with every departure from this type diphtheria cropped up. The starting-point of our epidemic, for instance, coincides with a disturbance of this kind when a low tide had usurped the place of a high one, and was succeeded by a misplaced high tide, the effect of which was to charge the soil with moisture just at a time when it was most important it should be dry. In this manner the annual soil washing that should have taken place during the winter of 1888-89, but did not, and the aëration that ought to have followed in the summer of 1889 but did not, together produced a conjunction of events, according to my belief, favourable to the production of diphtheria. That we may, together, view the facts in the same light, I must ask you to bear with me whilst I state precisely what I suppose to be some of the conditions concerned in this problem. My suggestions are that diphtheria is bred and born in polluted soil, that a damp condition of the atmosphere favours its existence, that in all probability it cannot exist actually submerged in water, immersion would drown it, for there does not appear a tittle of evidence to indicate that diphtheria is ever water-borne, nor does it appear to be easily air-borne; though very contagious, it seems to be so at close quarters only, and probably it is communicated by particulate matter, such for instance as may pass from one individual to another in the acts of coughing, sneezing, or speaking. If, therefore, it exists in the soil, we must believe that it lives somewhere above the water-level. It seems also probable that drought will kill it, and there can be no doubt decaying albuminous matter is necessary for its existence. In short, everything goes to

show that diphtheria is due to a microbe that lives a parasitic life upon dead or decaying animal matter, and that the animal body is liable to be attacked by it, the special phenomena of the disease being the result of the poison of its excretion. It seems also clear that the organism is aerobic, requiring its just proportion of heat, air, food, and moisture; and it appears to me that at or near the surface of polluted soil is a most likely place to find these conditions best fulfilled.

If this be true, we can imagine a patch of infected soil, thronged in its interstices by colonies of diphtheria microbes, ready to be discharged along with the ground air into the air we breathe, when from any cause that ground air is driven out of the soil. Besides the fundamental, and therefore the most important influence of the fluctuation of the subsoil water upon the development of the diphtheria microbe, without doubt, a rise in the subsoil water may of itself be a direct agent in the distribution of the germs, but I am by no means disposed to think it can be the most effective; my idea is that reduced atmospheric pressure and rainfall are the chief agents of distribution. It needs no argument from me to convince you of the powerful influence reduced atmospheric pressure must have in withdrawing air from the soil, our common sense of smell supplies evidence enough of this; but as respects the effect of rainfall, the method of its operation, may be, is not quite so obvious. That it is practically very effective in discharging ground air into our houses it appears to me there can be no doubt, more especially when the rain is sudden and copious; for at such times as soon as the outdoor exposed surface that receives the rain becomes temporarily sealed by moisture, the imprisoned ground air is driven laterally beneath protected parts, such as are sheltered by buildings, to find an easy way of escape through the unwetted surface that underlies our houses.

In the study of our records by the light of

these views I must ask you, therefore, to allow me to fix your attention upon these three things:—

The state of the barometer.

The rainfall.

The subsoil water level.

Now, in going through the records carefully, we find many instances of association of diphtheria with one or other, or several of these three effective agents; and if we merely glance at the diagrams it will be easy to discover typical cases of this sort.

As examples of the effect of reduced barometric pressure, I may point to 31st January, 11th and 15th March, 1888, January, March, November, and December, 1890; and of the rise of the subsoil water, March and November, 1888, February, 1889, and especially the sudden rise in June and October, 1889, also July, 1890; and of the effect of sudden rainfall at the end of October and November, 1888, again in February and April, 1889, also same year from 6th to 10th June, and almost daily throughout July and October, and lastly in March, July, and November, 1890.

If we analyse the 171 diphtheria cases with the purpose of ascertaining what amount of agreement there was between these several circumstances, we find that in 96 cases there is distinct evidence of coincidence, and of the remaining 75 cases, 48 can be accounted for by direct contagion, 17 by special circumstances, leaving 10 only unaccounted for; several of which, according to my notes of the cases, were of doubtful character as regards the exact nature of the malady.

No. of Cases.	Coincident with following favouring circumstances.
21	Barometer, rain, and water level.
12	Barometer and rain.
9	Barometer and water level.
8	Rain and water level.
14	Barometer.
17	Rain.
15	Water level.
96	Total meteorological.
48	Contagion.
8	Drain overflow.
4	Disturbance of polluted soil.
5	Association with Scarlet Fever or Measles.
10	Unaccounted for.
171	Total.

## SUBSTITUTES FOR ALCOHOL.

BY DR. A. J. H. CRESPI, Wimborne.

THE very exhaustive correspondence on Drink and Drinking, which has filled so many columns of the *Times* and the *Telegraph*, has attracted an immense amount of attention, although it is not too cruel to say that not one of the 257 letters in the *Telegraph* discloses a single fresh fact of importance; this may be admitted without denying that those letters were many of them excellent, nor was the *Times* more fortunate. The pros and cons of teetotalism have been worked at for years, and what remains for anyone to discover? Those who look upon alcohol as dangerous in the smallest quantity and in any vehicle learnt nothing fresh, though the correspondence was fully worthy of the prominence given to it, while the vastly larger number who advocate the moderate use, in spite of the frequent abuse, could not claim to have scored a victory, nor to have strengthened their position. Both the *Times* and the *Telegraph*, however, repeatedly drew attention to the want of beverages which could be regarded as popular and suitable substitutes for alcohol. Thoughtful abstainers have long felt this to be a difficulty, and many efforts have been made to overcome it. We, however, agree with Dr. B. W. Richardson, F.R.S., in his charming addresses on Total Abstinence, that no substitute exists, nor is any likely to be discovered. There is said to be something so exhilarating and inspiriting in beverages containing alcohol, that it must be confessed that no other drug can approach it in its effects. But it is this very property of elevating the drinker that makes alcohol so dangerous and seductive. Non-alcoholic beverages supply everything to the system that it needs: they quench the thirst, they assist digestion, they sustain the body in health and vigour, but they do not admit of being taken in quarts and gallons; however keen the thirst, one or at

most two glasses of cold water will satisfy it, and not even the most inveterate water drinker would care to take a third. Not so with alcohol; the first tumblerful cheers and refreshes, but there is commonly a strong desire for a second, then for a third, and so it goes on until cases are not unheard of in which forty glasses are swallowed—ten quarts—in rapid succession. It does not need to be a physician to know that such inordinate quantities of fluid are not required, nay, are positively injurious, and this apart from the alcohol in them; but it is the alcohol that leads to their consumption in such vast quantities.

If people demand beverages which will have an action upon them similar to alcohol, without any of its ill effects, science cannot help them, and they must be left to seek in vain; tea, cocoa—the most nutritious of all beverages—coffee, toast and water, barley water, and home-made lemonade will not serve them, and they must continue in their old course.

We are not giving a temperance address, and so we will not remind the reader that the temperance question rests for its chief argument, *not* on the injuriousness of alcohol in small doses, if, that is, that injuriousness can be proved, but on the danger that the strictly moderate use may lead to the abuse; and were it not for this frequent abuse, we should never have had a temperance agitation. The abstainer does not feel called upon to discuss the difficult question whether one glass of wine or a tumbler of ale does appreciable injury, for he knows that so many hundreds of thousands of his countrymen speedily exceed the narrow limits of strict moderation and do not confine themselves to the quantity which may be regarded as physiologically harmless, though that quantity is certainly very small.

Many temperance drinks are objected to on the ground of their sweetness, that is by moderate drinkers, for it is a curious matter that the life-long abstainer nearly always dislikes bitters, so do children; it is the person who has taken

alcohol regularly who objects to the sweetness of the substitutes offered him. Another complaint is that it is not possible to go on drinking lemonade, fruit syrups and other substitutes in large quantities ; but why should they be taken in inordinate amount : why should any fluid be swallowed to excess ? No one doubts the excellence of turtle soup, or of game, or of well hung tender mutton, but what would be said of a person who objected that he could not go on eating them for three hours at a stretch ? Why should people drink the whole evening, and really if the objection to non-alcoholic substitutes is that people cannot go on taking them hour after hour, that is one of the most cogent arguments in their favour.

But there are many bitter drinks to which even the moderate drinker cannot object ; certain sorts of hop ale are known that are perfectly free from alcohol, and which seem to meet the demand for fluid. True, as a rule, the water drinker only relishes them if he has been in the habit of taking beer, for their bitterness, useful undoubtedly in its way, is to the life-long abstainer a most serious drawback, and he would just as soon take a dose of medicine. That is the present writer's position. When this objection to alcoholic substitutes has been urged in good faith, we have frequently prescribed compounds of harmless bitters and water, or of dilute acids and syrups and tinctures that we knew not only stimulate the appetite and assist the digestion, but we have satisfied our client, and that was the most important thing to do. We have, in this way, many times completely removed the objection to teetotalism and earned the warm thanks of our clients.

A favourite objection to water is that it may be flat or polluted. That is true, though far too much is heard of this. But is it necessary to drink water in large quantities ? Assuredly not. A pint of fluid a day is sufficient ; indeed, our so-called solid food contains so much water that, except in hot weather or when violent and

long-sustained exertion is being kept up, it nearly satisfies the bodily requirements ; and, in addition, a cup of tea, coffee, or, better than either, cocoa or chocolate, twice a day is enough. Drinking beer, however, does not overcome the water difficulty ; it is the beer-drinker who gets through the largest amount of water, and if that water is not occasionally polluted and dangerous, it is because it is well boiled, and any disease germs it might contain have been rendered inert by the application of a high temperature. Abstainers have the same remedy at hand. They can boil their drinking water and then mix it with the tea or something equally efficacious, such as a few drops of some harmless bitter, or syrup, or lemon juice ; indeed, unless the desire for alcohol is very deep seated, we can readily provide substitutes that satisfy the requirements of the system, and which at the same time we shall not be tempted to swallow in inordinate quantity.

We have all heard with undisguised amusement of Dr. Johnson's inordinate craving for tea—it has almost passed into a proverb. He has been actually credited with swallowing twenty-five cups at a sitting, and he would keep Mrs. Thrale brewing it for him till four o'clock in the morning. The following impromptu, spoken to Miss Reynolds, points its own moral :—

For hear, alas, the dreadful truth,  
Nor hear it with a frown :  
Thou canst not make the tea so fast  
As I can gulp it down.

But surely how many people living in the present century and rejoicing in the knowledge which science has brought to our doors, would care to imitate the great doctor in those excesses of eating and drinking, which he did not perceive to be as dangerous as they were undoubtedly disgusting and odious.

Robert Hall was equally fond of tea, and has been accused of drinking twenty-six cups at a time—a quantity testifying rather to his fondness of the decoction than to his knowledge of what was good for him.

Many people dose themselves with strong medicines, not merely uselessly but injuriously, for the relief of some pain or disorder which, though perhaps not originally serious, has a tendency to become dangerous from the very measures taken to relieve it. The sufferings from indigestion are often barely endurable; if work is to be done, almost anything will be swallowed in order to ease them; nay, even mere lassitude is almost equal to pain in its imperative demand for relief. Not only is the whole round of alcoholic liquors resorted to to obtain mere temporary relief, but powerful drugs of every kind are recklessly tried and temporary ease is often gained at the expense of still severer attacks of pain or debility, which in their turn lead to an increased consumption of narcotics and stimulants, and these dangerous drugs provoke aggravated returns of the complaint. No subject is more worthy of investigation than this, and nothing could well be more useful than some medicine, which would alleviate pain without aggravating the causes from which it springs. Malt has long been known to have remarkable curative and restorative properties; it is also a very valuable nutrient. The diastase it contains digests starchy food, while its phosphates of lime, potash, and soda, are readily absorbed by the tissues and bones, and its malt sugar and dextrine are highly useful nutrients: it is a vulgar mistake to suppose that these valuable properties are preserved in beer, the truth is that by fermentation and excessive heat they are almost completely destroyed and an infusion of malt, concentrated in *vacuo* at a moderate temperature, and without fermentation, is the only preparation fully representing the medicinal activity of malt. This is, indeed, the main proof of its efficacy; for the therapeutic action of malt, so difficult to get from the best ale or porter, is to promote digestion of starch and to increase the strength of delicate or enfeebled constitutions. We do not know any preparation of malt that can be compared with Kepler

Extract: its taste is delicious and its usefulness surpasses that of all other preparations. Kepler Extract can be administered to adults or to children, and is agreeable either pure or mixed with milk or water. But though a single spoonful contains more of the active properties of malt than a pint of ale or porter, it is absolutely free from alcohol and carbonic acid, and of every other product of fermentation. Kepler Extract of Malt admits of much assistance from skilful combination, although the simplest method of administering it is with a slight addition of some aromatic beverage, or in combination with cod-liver oil.

We have lately been administering Kepler Extract to a poor sufferer whose grave condition taxed our medical skill to the utmost, while his sufferings were distressing to witness. His condition seemed helpless, and the time had come when, after a severe illness of eighteen months, he seemed likely to die of sheer starvation: he could not swallow any solid food, whilst his feeble powers of digestion seemed unequal to the effort of absorbing and digesting the simplest and blandest fluids. In this remarkable case the invaluable properties of Kepler were fully proved; the patient rallied and speedily regained strength and weight, and now for some months has literally lived on Kepler, getting from it renewed strength and health. His wife tells us that he often assures her that he could live on this pleasant food, and that he has never found half so much comfort from anything else, nor has his relish for it diminished. Now this is not a solitary case, and we venture to believe that hundreds of other sufferers, in a condition as grave and hopeless, have been kept alive by this useful and pleasant food.

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THE SOUTH OF FRANCE.—Those fortunate members of the community who can live and do as they please, and "go as they please," like the swallows, have had migration made still easier for them this winter, for owing to acceleration of trains they can now start from Victoria Station, London, at 11 a.m. and reach Nice at two o'clock on the following afternoon, the journey between Calais and Nice being accomplished without change of carriages.

## PUBLIC HEALTH REPORTS.

## REPORT ON WATER SUPPLY, PRESENTED TO THE SANITARY COMMITTEE OF THE VESTRY OF PADDINGTON.

I HAVE carefully read the "Report on Water Supply" sent by the Battersea Vestry, and, at your request, I forward my views on the subject.

Into the question of the purity or otherwise of the water supplied on any particular date by the Lambeth Water Company or by the Southwark and Vauxhall Company, it is needless to enter, since neither of these companies supply this parish. But the larger question, of whether Thames water should be used for drinking purposes does interest this parish, since the companies that supply this district draw almost the whole of their supplies from the Thames.

By Act of Parliament, the various Water Companies are empowered to draw from the Thames no less than 110 million gallons of water each and every day, as well as 20 million gallons from the River Lea. Usually 85 per cent. of their water comes from these sources.

It should always be borne in mind that these two streams are in reality two natural drains ; they collect all the surface water that flows from a large area on each side of them. On the banks of the Thames are numerous villages and towns, which pour into the river the more or less purified sewage of about one and a half millions of people above the point where the companies take in their London water supply. The land on each side of the river is highly manured ; numerous streams, tributaries, and ditches drain the surrounding districts and discharge into the Thames.

This state of things must, as time goes on, become more intensified, since fresh towns and

villages and manufactories will spring up along the river, and more sewage and drainage will pass into it above the intake of the Water Companies. It follows, therefore, with such a supply, it is inevitable that some of the water supplied to London has already passed through other human beings living in the towns and villages higher up the river. Even granting that the supply taken from the Thames may at present be fit for drinking purposes, it is absolutely certain that it cannot always continue so. Another evil is the very abstraction of that enormous quantity of water daily from the Thames ; this mass of water naturally is the property of those living along the banks—of Londoners amongst others.

Now, instead of passing through London in its natural bed and serving to carry away with it the refuse borne into the river by surface waters, etc., it passes around and past London only to be discharged as sewage at Crossness and Barking Creek, after being drunk or otherwise used by ourselves. Part of it actually pays toll at least twice, having previously been purveyed by some water companies higher up the Thames and then discharged into the river as sewage above the intake of the London Water Companies.

Modern science doubts very much whether any "system of purification" will render sewage fit for drinking purposes.

Certainly it would be in every way far safer and better to seek for some other source of supply than the Thames or Lea.

However fit these may have been when our needs were less, and when the streams were purer, it is beyond doubt that neither the quality nor quantity will long suffice for the needs of London.

Such facts must be borne in mind whenever the present Water Companies are replaced by a municipal body.

ALF. W. STOKES, F.C.S., F.I.C.,  
*Public Analyst for Paddington, &c.*

## CHURCH BELLS: A NUISANCE IN TOWNS.

A SOCIETY has been formed in New York, with branch societies in Philadelphia and other American cities, for the suppression of the intolerable annoyance created by the frequent, noisy clanging of inharmonious church bells. It has often been a marvel to us, on finding ourselves in the vicinity of churches where the habit of bell-ringing at frequent periods prevails, how people have so long put up with the nuisance thus created in populous localities where the church bells—generally the least musical and cheerful of their kind—are tolled with doleful pertinacity, on week days and Sundays alike; and we are therefore not surprised to learn from an American correspondent that Dr. Degenhardt, the president of this new society, has received hundreds of letters from residents in New York, Brooklyn, and Jersey City, expressing their approval of the movement which he has set on foot, and giving instances of the great disturbance of quiet and repose, with serious injury to health in the case of invalids, of persons unfortunately resident in the neighbourhood of such superfluous and discordant bell-ringing.

To Paulinus, Bishop of Nola, is commonly given the credit of first introducing bells into ecclesiastical use about the year 400; and we find it mentioned in ancient French history, upon monkish authority, that in the year 610, the Bishop of Orleans, being at Sens, then in a state of siege, actually frightened away the besieging army by causing the bells of St. Stephen's Church to be rung, a circumstance which may be accepted as a proof, both that church bells were rare in those days, and that although the besiegers were styled "barbarian," they had a keen, natural sense of the distinction between discord and music.

But the disposal of a besieging force was nothing as compared with the virtues claimed for church bells in former times. According to

Dr. Fuller, they sometimes bore the following motto:—

"Men's death I tell with doleful knell,  
Lightning and thunder I break asunder,  
On Sabbath all to church I call,  
The sleepy head I raise from bed,  
The winds so fierce I do disperse,  
Men's cruel rage I do assuage."

In his quaint way, Fuller makes these comments:—

"Bells are no effectual charm against lightning. The frequent firing of abbey churches by lightning, confuteth this proud motto. Abbey steeples, though quilted with bells almost *cap-à-piè*, were not proof against the sword of God's lightning. Yea, generally, when the heavens in tempest did strike fire, the steeples of abbeys proved often their timber, whose frequent burnings portended their final destruction." In our matter-of-fact days, when "the heavens in tempests strike fire," the lightning-conductor, and not bell-ringing, is regarded as the best safeguard.

Even his Satanic majesty the devil was at one time supposed to be under the control of the church bells, which were baptized\* and anointed with the chrism or holy oil, and afterwards exorcised and blessed by the bishop, from the belief that when these religious ceremonies had been performed the bells would have power to calm tempests, keep off plague and pestilence, and drive away the devil and his host of demons and imps.

The origin of tolling the "passing bell" during the dying moments of a sick person was to drive away the invisible evil spirits supposed to be standing about the foot of the bed, near the door, or hovering in the air, wickedly intent on capturing the soul of the deceased as it wended its way heavenwards. So great was the belief in the efficacy of this precaution that it was usual to charge a specially high price for tolling the largest bell in the church, because that, being the loudest, would compel the evil spirits to get further away, so as to be clear of

\* A custom still observed in Roman Catholic countries, where it is the practice to give some saint's name to the bells.

the sound. Now, the so-called "passing bell" is not rung till after the sick man's death; but much superstition prevails on this subject in many rural districts, and we well remember the dire offence which we gave, years ago, to the inhabitants of a small country town in the Midlands, through our paying the village sexton *not* to toll the church bell after the death of a near and dear relative, our object being to avoid harrowing the feelings of survivors by the dismal sound.

Other uses to which church bells were, and in some localities still are, put during the week-time may be regarded as of public utility. At the town of Southam in Warwickshire, for instance, a bell is rung at the hours of 1 p.m. and 8 p.m. (the latter, doubtless, being the survival of the curfew bell, and consequently a custom eight hundred years old), both denoting important periods of the day in a rural community, and particularly useful in times when clocks were few and Waterbury watches unknown.

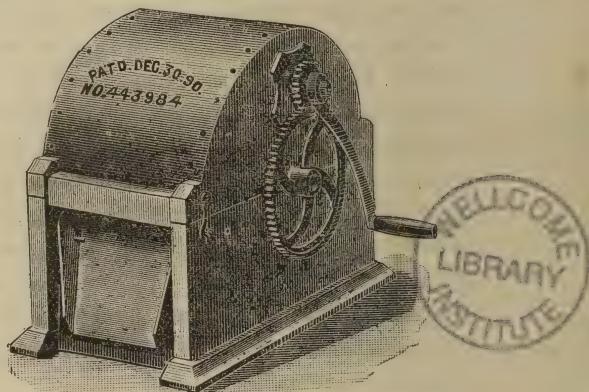
A chief use to which church bells are now put is to summon the worshippers to service; and this brings us back to the remarks at the commencement of this short article. When bells are fairly melodious, as old church bells are wont to be, when the adjacent locality is not densely populated, and when the ringing is neither frequent nor unduly prolonged, little room exists for objection; but when these conditions are reversed, especially upon week-days, then not only does the ringing fail to assuage men's cruel rage, as the verse we have quoted says, but it constitutes a constant source of annoyance to everyone within earshot, while it seriously affects all who are in bad health, and who, therefore, stand in need of quiet and rest. It cannot be reasonably argued by those who encourage the practice of frequent and lengthy tolling of church bells, that it is necessary or useful, though, possibly, it may (as has been suggested) act as an advertisement for those persons pharisaically disposed. Nonconformist congregations contrive to meet for the performance of their religious services without the

aid of bell-ringing; and churchmen or church-women would probably be greatly surprised at, and almost doubt the sanity of, any person who should suggest to them the necessity of a special reminder to keep any secular appointment, whether for business or pleasure. Surely, then, they might manage to attend a religious service without the noisy tolling of bells for full half-an-hour previously.

In conclusion, from what we know of clerical excesses as regards bell-ringing in both hemispheres, we not only believe that Dr. Degenhardt and others in the United States have good grounds for their protest against superfluous bell ringing, but we wish them speedy success in their efforts to obtain legislative redress; and we hope to see a society, having similar aims to their own, established in this country.

EDITOR.

#### NEW INVENTIONS.



Amongst the numerous novelties shown at the recent Food and Cookery Exhibition there was none which attracted more attention than that rightly described as the "Little Wonder" Freezer, which accomplished the instantaneous manufacture of ices or ice creams, thus constituting a remarkable contrast with the old-fashioned tedious methods hitherto in vogue. The apparatus is simplicity itself, and far superior to any other hitherto devised for the same purpose, whether as regards economy, cleanliness, expedition, compactness, or ease in working.

It consists of a square wooden box, in which are contained a metal lining and a metal cylinder, the latter worked by a handle on the outside. This cylinder is filled with broken ice and salt; next, the cream or milk, properly prepared, and flavoured, is poured into an aperture at one end of the apparatus. As the cylinder, which nearly touches the bottom of the metal casing, is revolved by turning the outside handle, the fluid is brought into contact with it, and immediately frozen and passed on in a delicate snow-like flake to the outlet at the other end of the apparatus, where it can be collected and the ice-glasses filled with it, ready for use. One charge of ice and salt, at a cost of 3d. or 4d., will enable the machine to be run for six hours. The apparatus is worked so easily that a child could readily use it.







